DEPARTMENT OF TECHNOLOGY
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OCTOBER 20, 1956
VOL. 151 — NO. 16

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Published every week on Saturday by TELEPHONY PUBLISHING CORP. 608 S. Dearborn St., Chicago 5, Ill. Subscription $3.50 per year. Entered as second class matter at the Post Office at Chicago, Ill., under the act of Mar. 3, 1879.

Guaranteed Circulation This Issue
11,391 of Which 10,862 is Paid

TELE-FLORA

California florists were told how to speed flowers by telephone at this exhibit of the General Telephone Co. of California at the recent convention of the state florists' association. Story on p. 55 tells results of project.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

XUM

CANDIDATES

on a money-making platform

With Stromberg-Carlson telephones, you make money many ways:

Thanks to rugged construction and superior engineering, operating life is lengthened and maintenance reduced to a minimum. Thanks to an ingenious variety of special features, you can offer any number of extra services which earn extra revenue.

Enroll *your* company on the money-making platform and enjoy an assured prosperity!

PLATFORM

"1543" Desk-type

Most modern appearance. Lightweight. Extended number plate on dial with the industry's favorite dust cover. Optional two-step hookswitch. A most economical telephone set for "standard loss" subscriber loops.

Two-tone 'phones

Help you meet the demand for color right out of your *current* inventory! You buy colored housings only—loosen one screw on an existing instrument and slip the black housing off... the colored one on. In 8 handsome colors.

"1575" Multi-line

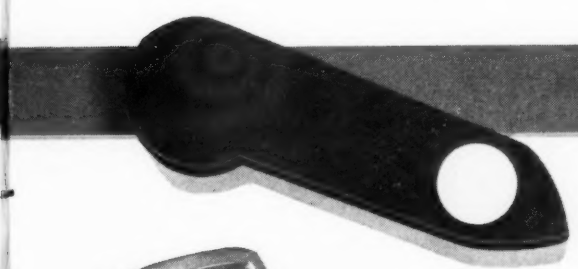
This handsome 'phone, used with the "6K-1 System," is the equivalent of a small switchboard. Each station can originate or receive calls on 1 to 4 C. O. or PBX lines, hold calls and talk on local intercom. For manual or dial service. Standard gray color.

XUM

PLATFORM

"1543 W" Desk-type

This "W" type looks just like its brother at left but is equipped for high transmission efficiency on "high loss" subscriber loops. Since the "1543" and "1543 W" sets look alike—you can give a nearby subscriber a standard 'phone (at a lower cost to your company) and a more distant station the extended-range type. Performance and looks to the subscriber will be the same—and the subscribers will feel they have been treated alike.



Full-color 'phones

Sure-fire way to increase revenue. All these colored instruments are the high-efficiency "W" type. And all are quickly convertible to wall mounting. Dial has satin-finish chrome finger wheel. Cords are matching color Koil Kords.

PLATFORM

"1543" & "1543 W" Wall-type

Inventory-saver! A "1543" desk-type telephone is converted to wall use by a screwdriver, 4 screws and two substitute plungers. Gives you another way to increase revenue from *extension* telephones both for home and business.

"1573" Two-line

Every boss-with-a-secretary, or anyone sharing lines, will gladly pay extra for this convenience. Two lines, each with Hold feature, plus a third line for intercom or local PBX service. Dial or manual service. Standard gray color. Also available in black.

STROMBERG-CARLSON COMPANY

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3.

6-E PABX

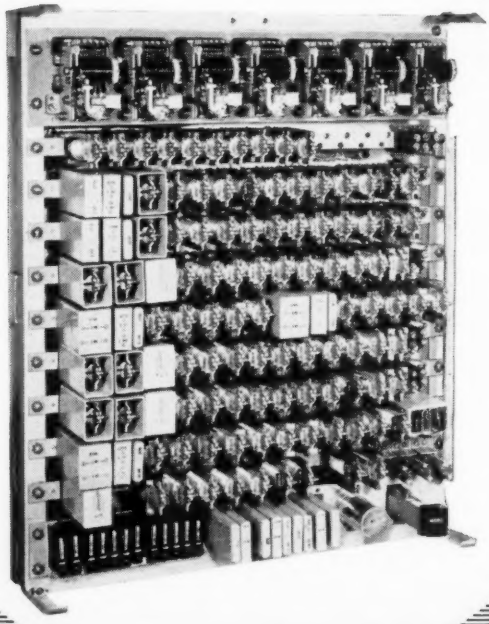
- Easy to install — wall-mounted uni
- Compact overall size
- Attractive dust-proof cover
- No special room required for unit

MORE REVENUE from BETTER SERVICE To Your Subscribers with FEDERAL 6-E or 11-P PABX UNITS

The Most Modern Dial PABX System Available

All Features Included as Standard

PROMPT DELIVERY

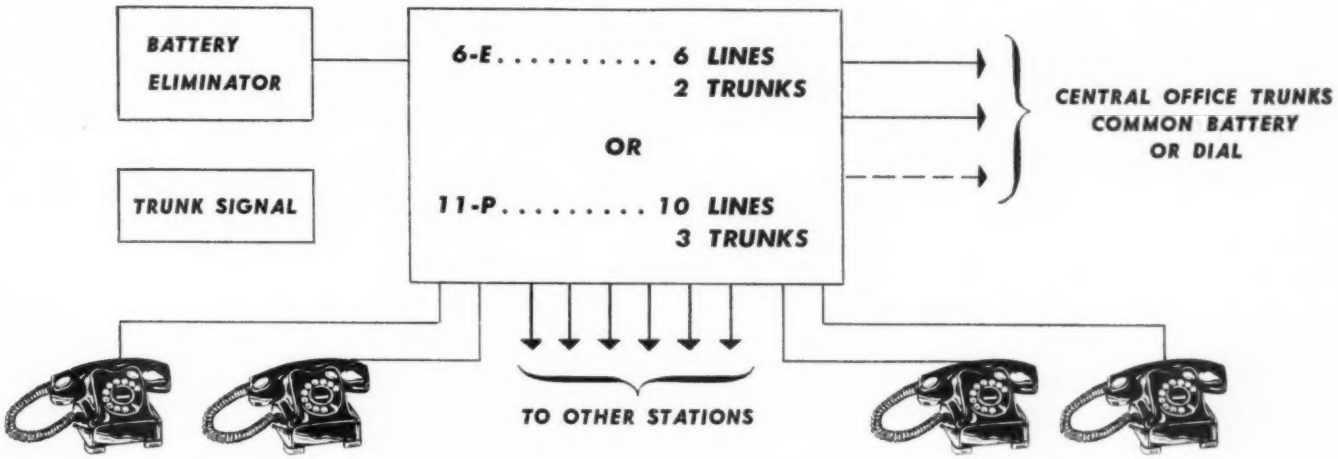


11-P PABX

- Relay type equipment
- Relays with twin contacts
- Ringing current and tones included
- Easy to service
- Line, trunk and power terminals in rear
- Operated from battery eliminator or batteries

XUM

TYPICAL INTER-COMMUNICATION LAYOUT



NON-ATTENDED—any station can answer any trunk call and extend call to another station

OUT-GOING CALLS—Can be made from any station

COMPLETE SERVICE—All features are standard

TRUNKS—Arranged for common battery or dial

SECRET SERVICE—Conversations are secret on all connections

A LONG-LIFE REVENUE PRODUCER

Kellogg *alone* offers you these famous Federal PABX's!

It will pay you to find out — *to get the facts* — how PABX will increase your revenue by giving your subscribers the kind of service required for small systems. For full information, clip the coupon now — or drop us a line on your letterhead.

BE PREPARED TO SERVE *PABX* APPLICATIONS PROMPTLY

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FLASHES AND PLUGS

ALL IN THE DAY'S WORK. "There are, we understand, a couple of Rockford gentlemen who could probably make a good living as prospectors," comments *Illinois Bell Telephone News.*

"We gather that impression from a recent letter of commendation by a Rockford customer. During the course of a business office visit, the customer used a booth to place a long distance call. Some time later she discovered, to her horror, the diamond was missing from her ring.

"As so many customers do in an emergency, the lady turned the problem over to Illinois Bell. And, as is also customary, Illinois Bell came through.

"Janitors Charlie Robinson and George Sample walked over to the booth from which the call had been placed. With the most nonchalant air, they reached down and picked the diamond from the floor.

"And then with the air of men to whom finding a needle in a haystack is a cinch, they went back to their more prosaic duties."

•

SMART OPERATOR. A man who believed he knew all about parrots undertook to teach what he thought to be a young, mute bird to say "Hello!" in one lesson.

Going up to the cage, he repeated that word in a clear voice for several minutes, the parrot paying not the slightest attention.

At the final "Hello!" the bird opened one eye, gazed at the man and snapped out, "Line's busy."

•

THE COMPETITIVE SPIRIT. A famous maker of Eau de Cologne in Germany forced a cesspool cleaning company to stop using its trademark for advertising, reports the United Press.

The makers of "4711" Cologne took the cesspool cleaner into court for painting these numbers on his truck. The defendant said he was only advertising his telephone number.

•

DOUBLE TROUBLE. In Baltimore a tree-trapped cat led to the usual call for assistance from the fire department, recently.

By the time the firemen arrived, however, the picture had changed, and they had to rescue a tree-trapped man who had tried to rescue the tree-trapped cat.

•

AMANDA TALKS BACK. A LaGrange, Ill., toll operator got a nasty shock recently. Completing a toll call, she heard Amanda begin her message. Suddenly, the same voice said, "Hello, Hello. Is someone on the line?"

"Are you alive?" said the startled operator. "I certainly am," said the voice. "Just came in to turn off my answering device."

CIRCULATION

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Since 1901

October 20, 1956

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WESTERN REPRESENTATIVES:
McDonald-Thompson, San Francisco, Cal.
Also offices in Los Angeles, Seattle, Dallas and Houston, Tex.; Tulsa, Okla., and Denver, Colo.

Vol. 151, No. 16. Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 South Dearborn St., Chicago (5), Ill. 20 cents per copy (except special issues). Subscription $3.50 per year U. S.; $4.50 Countries in U. S. Spanish Postal Zone; $4.50 Canada; $5.50 Other Countries.

Telephone WA bash 2-2435

XUM

This extra convenience for your subscribers means extra revenue for you

HANDS FREE TELEPHONE

This extra-revenue instrument has won widespread acceptance among businessmen, housewives and others who want two-way conversation even when their hands are busy.

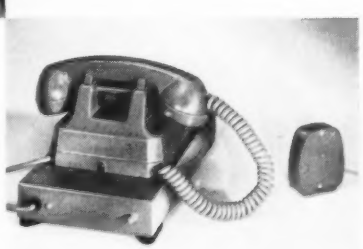
When you offer your subscribers the Stromberg-Carlson *Hands-Free* Telephone, you're on a fast-rolling bandwagon to increased income for your company.

Our *Hands-Free* 'phone incorporates improvements that make it superior in every way. Its efficient operation, minimum service requirements and handsome appearance assure greater subscriber satisfaction.

Your nearest Stromberg-Carlson sales office will be delighted to supply you with one or two demonstration instruments and hard-hitting sales literature.

1. Installation of this two-piece instrument takes only 14¾ minutes. You need only connect the line cord, plug in to a 110-volt AC outlet and attach the mike cord. (Some designs take 3 to 4 hours to install.)

2. The microphone is separate, not built into a heavy, cumbersome instrument. It can be set in any convenient place, has a 12′ cord; is non-directional: it works from front, side, rear.



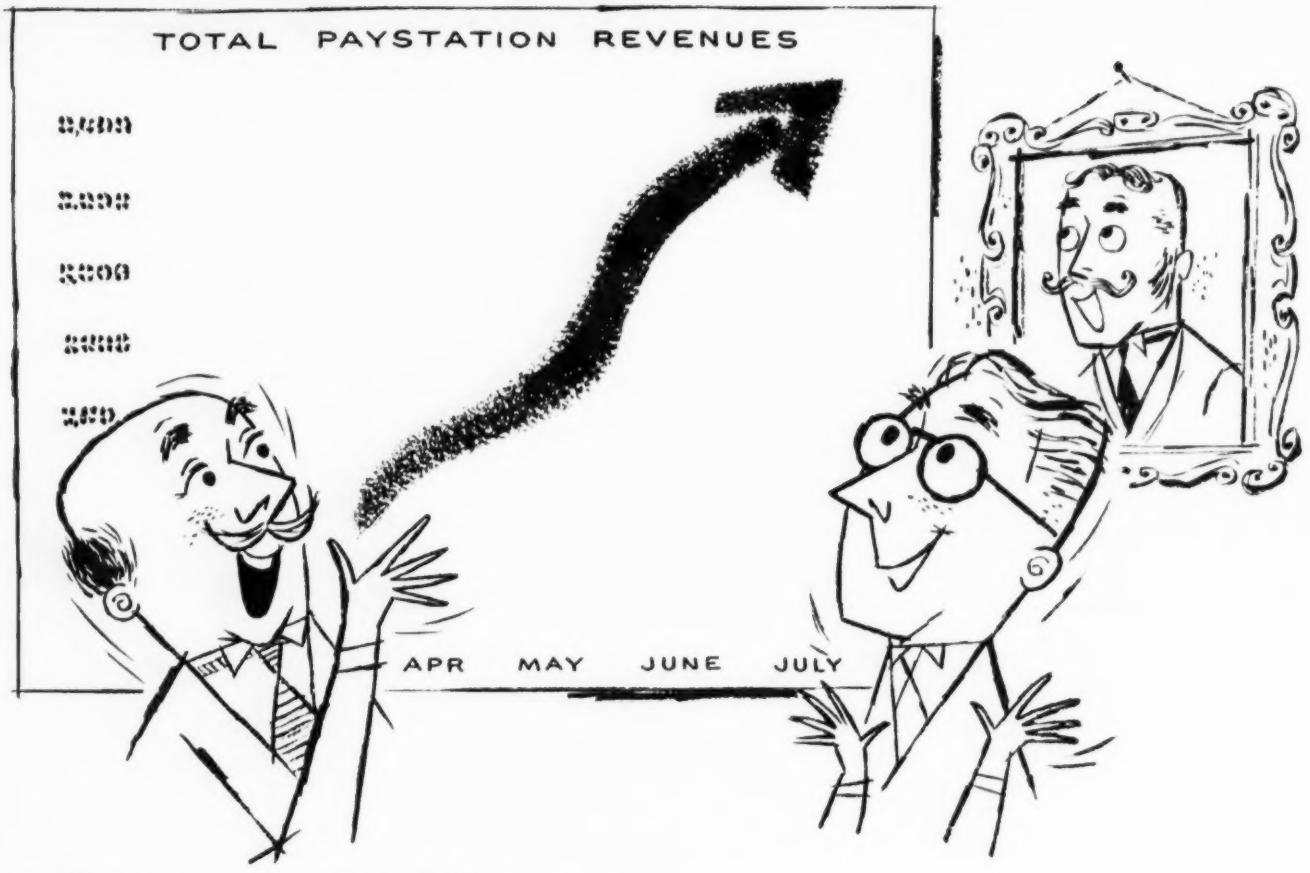
3. This instrument has AVC (Automatic Volume Control). If the user talks too close to the microphone, automatic compensation prevents sudden, unpleasant "boom."

4. Simply by lifting the handset, a subscriber can use the Stromberg-Carlson Hands-Free 'phone as a conventional instrument. It is easily switched back and forth between conventional and loudspeaking operation.

STROMBERG-CARLSON COMPANY

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 6, Chicago 6, Kansas City 8, Rochester 3, San Francisco



"things are looking up... since we put in OUTDOOR PAYSTATIONS!"

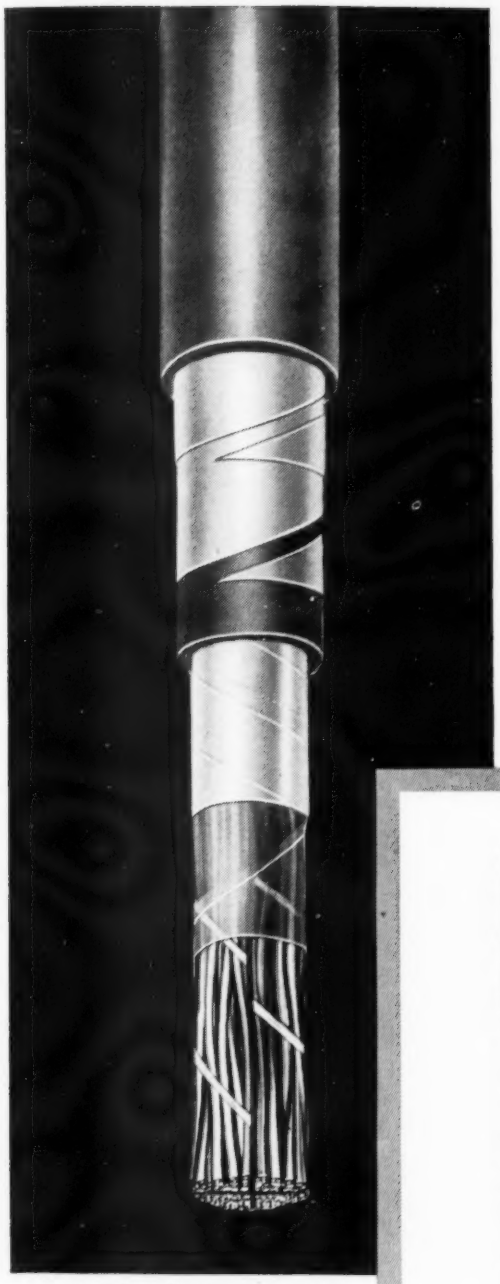
Even the president's mustache curls upward at this climbing revenue curve. Credit for the rise in revenue goes to the new outdoor paystations, *and to the employee who suggested installing them.* (He's practically a hero to company management... and to the grateful public!)

Autelco Paystations, in attractive booths, marked with big, colorful signs, are bringing in more revenue to companies everywhere. Located at well-lighted, busy highway junctions, drive-ins, supermarts, their convenience is proving irresistible.

Why not do yourself and your company a good turn? Write today for our Survey Simplifier...it'll help you put paystations at the spots that pay *best.*
Address: *Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.*

AUTOMATIC ELECTRIC

ORIGINATORS OF THE DIAL TELEPHONE

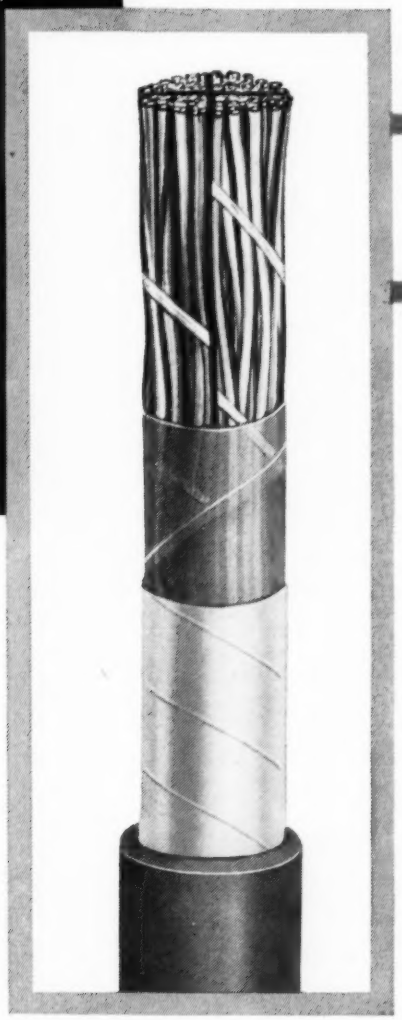


Type VII: direct earth burial

GENERAL CABLE QUALITY...

SUPERTEL

THERMOPLASTIC TELEPHONE CABLE



SIZES 19, 22, 24
***and now in* 26, AWG**

Type III: aerial and duct installations

Superior electrical quality and tough, high-molecular-weight polyethylene jacket ensure permanent high quality transmission. Withstands abrasion, bending, effects of sunlight or chemicals, low temperature deformation or cracking.

Distributed through Automatic Electric Sales Corporation.

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***for quality and service . . .* specify GENERAL CABLE**

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ARKANSAS ASSOCIATED TELEPHONE COMPANY
SIXTH N. B. W. BUILDING
34TH AND BROADWAY
KANSAS CITY 11, MO.

May 24, 1956

Mr. Willard Dobbeck
Superintendent Equipment Engineer
Leich Electric Company
Genoa, Illinois

Dear Mr. Dobbeck:

Thank you! Thank you and all of those at Leich who played a part in helping us during our recent emergency at Lake City, Arkansas.

At 11:00 a.m. Sunday, May 20th, I received a call from Mr. W. L. Bryant at Lake City advising that lightning had destroyed our power panel and associated equipment at Lake City causing the entire exchange to be out of service.

A few minutes later I was relaying the story of our plight to you by telephone and your promises of immediate action were very gratifying. More gratifying than this, however, was the rapid fulfillment of your promises, evidenced by the fact that an installer and all of the necessary equipment to put us back in operation arrived by air at Memphis, Tennessee at 12:00 midnight of that same day - just a little more than twelve hours after I first called you!

Through our years of doing business with Leich we have found such service as this to be the rule rather than a rare experience.

This example and our past relations with your company has proven to us that service continues after installation and that we can rely on Leich at all times. This type of service has been extremely beneficial to us in providing good telephone service to our customers.

Thanks again.

Yours very truly,

ARKANSAS ASSOCIATED TELEPHONE COMPANY

Verne E. Hix
Plant Construction and
Maintenance engineer

VEH/mf

cc: Mr. D. C. Gibson, Pres.
Leich Sales Corporation
427 West Randolph Street
Chicago 6, Illinois

manufacturers of telephones, switchboards and related apparatus since 1907
PACIFIC COAST: 11401 WEST PICO BLVD., LOS ANGELES 64, CALIFORNIA
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GENERAL TELEPHONE SYSTEM

"I know what it's like to sleep all night... we're using IRRADIATED cable!"

NEW...IMPROVED

SUPERIOR TELEPHONE CABLE

NOW contains a polyethylene tape* developed by radiation chemistry

New, improved SUPERIOR TELEPHONE CABLE *maintains* the service longer because the dielectric strength is doubled for greater lightning protection! Maintenance costs are cut because outages are reduced to a minimum.

SUPERIOR CABLE saves splicing time and gives better all-round service too because the deviation in mutual capacitance is now less than 1½%!

And because the insulation is "graded" to conductor sizes . . . the universal transmission standards for loading coils and terminating equipment is closely matched!

SUPERIOR CABLE is accepted by REA and conforms to REA Spec. PE14.

Use all-plastic SUPERIOR CABLE for aerial and direct burial installations . . . it's resistant to moisture, ozone, oils, acids and alkalis! Available with regular spiral shield (5 mil aluminum) or, in certain sizes at slight additional cost, longitudinal shield (8 mil aluminum).

A self-contained tape, marked at one foot intervals up to 10,000 feet, guarantees the footage you receive and lets you measure the footage you use.

For Top Performance at less cost . . . order Irradiated SUPERIOR CABLE today.

"Super-Splice"

Make splices MOISTUREPROOF, WATERPROOF . . . from inside out!

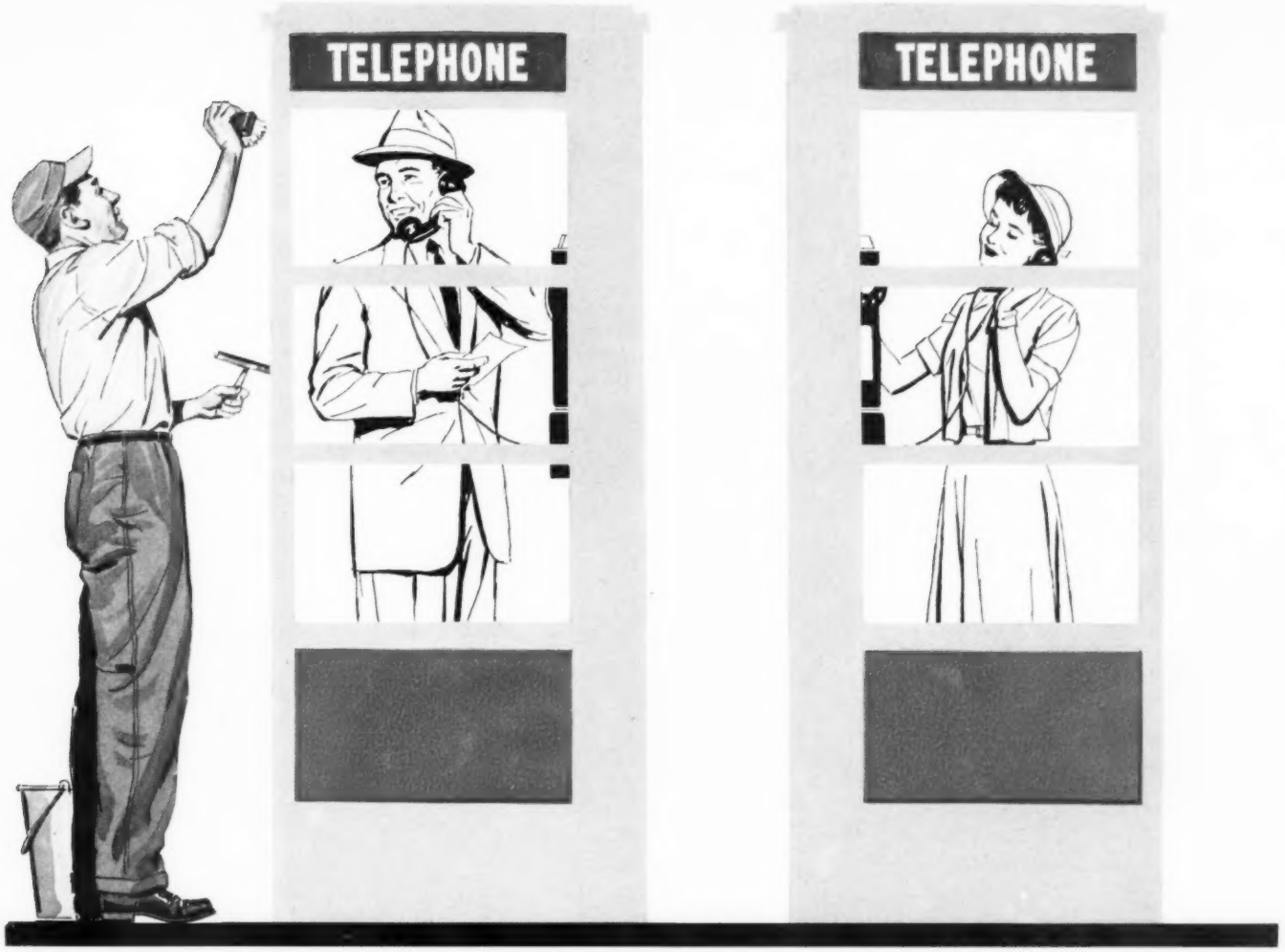
New Superior "Super-Splice" makes the splice permanently as good as the cable. An REA Standard. Write for details.

**Irrathene® irradiated polyethylene film, a General Electric product.*

For detailed information and price, write

SUPERIOR CABLE

SUPERIOR CABLE CORPORATION Hickory, North Carolina



Here's all the maintenance your Alcoa booths will ever need

Just an occasional washing with soap and water keeps your Alcoa® Aluminum outdoor booths shiny and new looking. They'll practically never need any other maintenance.

The finish, outside and inside, is anodized aluminum, an original Alcoa process which produces a very hard, durable surface. Dirt, smudges and pencil marks wipe right off. Aluminum is naturally very corrosion resistant, but anodizing makes it even more so. Alcoa booths never need painting.

These booths are very sturdily constructed and have the full approval of REA and Underwriters' Laboratories, Inc. The parts are interchangeable and any part can be easily replaced if damaged by an automobile.

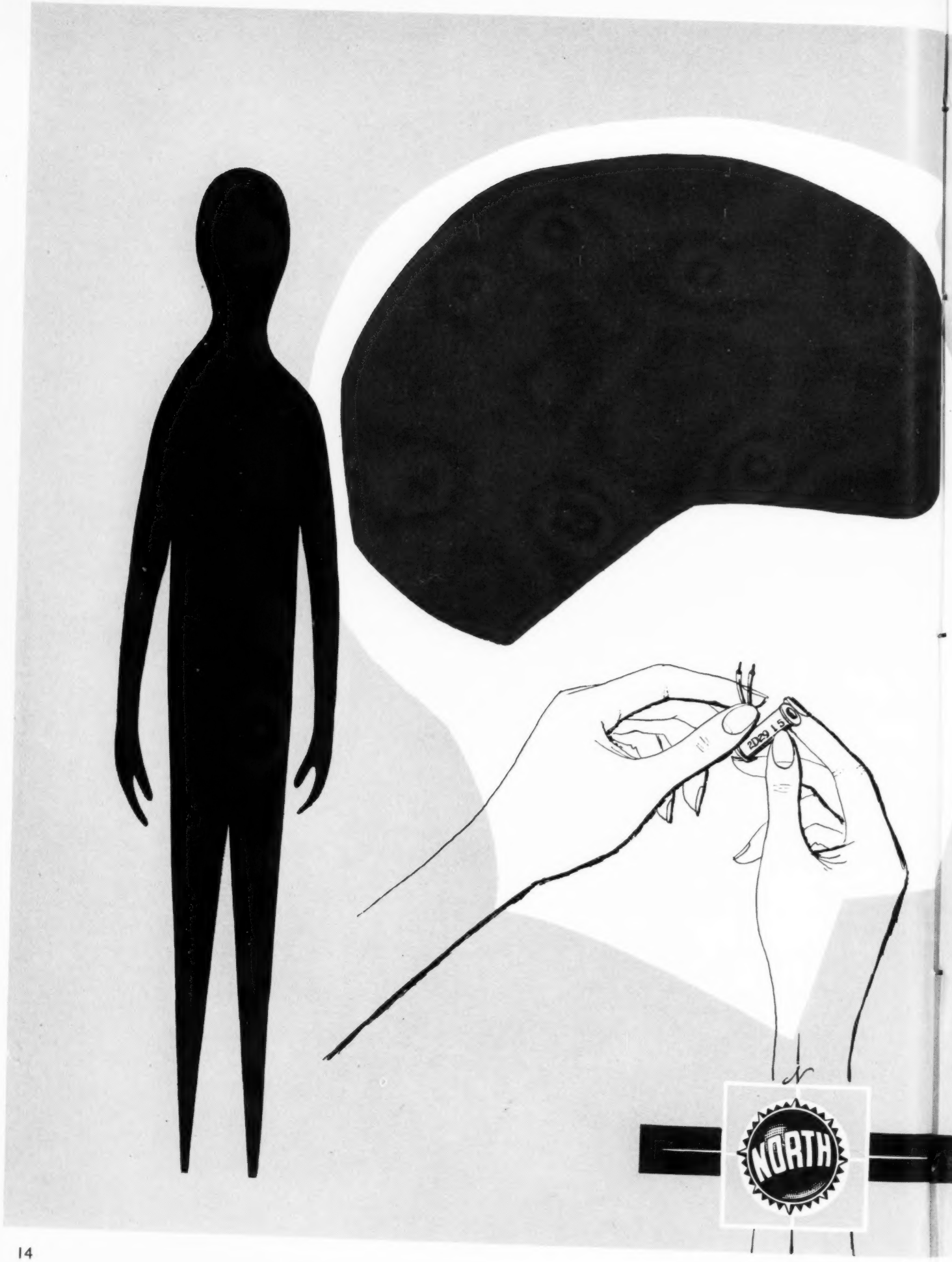
Thousands of Alcoa booths are now in service and they're real money-makers, in service 24 hours per day. Patrons like the bright, attractive appearance and roomy interior (33½" square x 86½" high). Louvers provide good ventilation, and a handy shelf holds parcels.

Contact your jobber or write for informative folder on Alcoa's new money-making booths, another product of Alcoa's Jobbing Division. Aluminum Company of America, 1690-K Alcoa Building, Pittsburgh 19, Pennsylvania.

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value


NORTH

human skills shape the future...

During the USITA Convention, thousands of visitors to the NORTH exhibits saw some of the most advanced telephone equipment ever offered the Independent Telephone Industry.

- Shown for the first time was the exciting new ERICOFON, years ahead in style, beauty, and utilitarian design!
- The full line of Desk and Wall Telephones in refreshing Color-Tones evoked the praise of many!
- North By-Path Crossbar, the most advanced switching system available, attracted great interest!
- North's improved Carrier proved to many the increased service potential it opens without the prohibitive cost of physical line construction!
- North's AuTollizer® dramatically demonstrated automatic handling of direct distance dialing—the toll service of the immediate future!

These products represent significant advances in the field of telephone equipment!

These products represent NORTH to the Independent Telephone Industry!

AND—these products represent the results of the cumulative efforts of the hundreds of men and women at North who are constantly striving to design and build better equipment for telephone communication!

It is this behind-the-scenes effort, the meticulous attention to detail, the painstaking thoroughness, the constant striving for improvement, that characterizes NORTH and NORTH Equipment!

- Communication is vital to America!
- The men and women at North derive a deep sense of inner satisfaction in serving this vital field!
- NORTH is proud to serve the Independent Telephone Industry!
- NORTH is proud of the equipment it provides the Industry!
- And NORTH is proud of the nearly two thousand men and women who, in the final analysis, **are** NORTH!

NORTH ELECTRIC COMPANY

601 SOUTH MARKET STREET • GALION, OHIO

how good is YOUR net?

Your net revenue from your Directory, of course.

Not as high as you'd like it?

Ask us about our COMPLETE
DIRECTORY SERVICE PLAN now used by
independent telephone companies
in 4400 communities.

It could be the tonic *your* Directory needs.

You are cordially invited to write any one of our Division Sales Offices listed below, or Frank Davies, Chairman, or Wesley H. Loomis III, President, for information concerning our Directory services — and if the spirit moves you, call us collect.

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XUM

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

FCC radio order favors telephone company operations. Report results of REA quiz of Independents. D. C. Power inducted into Newcomen Society of North America. RCA's board chairman, David Sarnoff, forecasts the electronic future.

CERTAIN RADIO communications experts for utilities, other than telephone companies, are dissatisfied with the recent action of the FCC, last month, in allowing telephones to share radio frequencies in the band (450 to 460 megacycles) heretofore reserved for utility intra-industrial communications services.

The National Committee for Utilities Radio is a group of radio communications experts for utilities other than telephone companies. It has asked the Federal Communications Commission for a rehearing and stay of the FCC's order, dated Sept. 21 (Docket No. 11,435), which authorizes communications common carriers (mostly telephone and telegraph companies) to share for the first time in a band of frequencies known under the FCC's allocation label of Power Radio Service.

Just what chance the committee has of getting the FCC to reopen this matter is very problematic. This observer, guessing solely on the basis of past FCC performance, would say that the chance is rather slim. But unless the FCC changes its mind, its tentative order will become final and effective Oct. 29. The FCC report, which accompanied its order late last month, limited telephone company operation on these frequencies only to their own construction and maintenance activities. They would not be allowed to use them for revenue-producing purposes.

The basis of the FCC order was the seemingly reasonable policy of simply allowing the telephone companies to make the same use of these frequencies as other utility industries. Gas, electric, water, and steam utilities (both business-managed and government-operated) have been using these frequencies for radio and microwave intrasystem communications in connection with their own industrial operations, such as in connection with pipelines, transmission lines, construction, maintenance, emergencies, etc.

The National Committee for Utilities Radio contended, however, that the FCC order, allowing the telephone-telegraph group to use six frequencies in the Power Radio Service band, would result in overcrowding an area of the radio spectrum which is already congested. The committee requests the FCC to create a new band for the telephone-telegraph group, even though restricted to nonrevenue use.

REA Quizzes Independents

Do the Independents need money? More particularly, do the Independent companies stand in need of financing which is unobtainable through conventional commercial loan and banking sources? For obvious reasons, the Rural Electrification Administration wanted to know about this, and last spring REA circulated a questionnaire to nearly 5,000 Independent companies. Less than a quarter of them responded. Of those who replied, almost three-quarters said they *could* use some borrowed capital to improve and expand their system.

REA announced the results of this survey in a release dated October 11. It might be noted, however, that nearly half (46 per cent) of those who did say that they could use borrowed capital to good advantage, added that they felt they could borrow sufficient funds under satisfactory terms and conditions from private sources to do the necessary things to improve and expand their systems and services.

The questionnaire also contained a request for suggestions by the Independent telephone companies as to how the REA telephone loan program might be improved or made more useful to the Independent companies. The requests, according to the REA release, contained the following specific suggestions:

". . . Eight per cent thought the cost of preloan engineering required by REA too expensive.

"Eight per cent said that rigid specifications and engineering expense cause plant costs to be too high. Seven per cent stated that smaller loans were preferred for adding to and improving existing plant.

"Five per cent thought REA assumes too much control of its borrowers. Four per cent complained that obtaining an REA loan requires too much time.

Three per cent thought even REA's equity requirements too difficult to meet, and two per cent said loan requirements in general were too stringent. Five per cent asked for more information on how to get a loan from REA."

It might also be noted that of the 1,135 Independents which replied to the REA's industry questionnaire, well over half (58 per cent) were from Independent telephone stock corporations, 10 per cent came from cooperatives, 12 per cent from mutuals, 16 per cent from individual proprietors, and 4 per cent from partnerships. Of all those, slightly less than a fourth are either REA borrowers already or have submitted applications for loans.

D. C. Power Made a Newcomen

It was before a blue-ribbon banqueting audience of nearly 400 black ties, including top-flight corporate executives and industrialists, as well as leading financial and professional figures in American business life, at the Hotel Pierre in New York City on the evening of Oct. 4, that Donald C.

Power was made a member of the Newcomen Society of North America. That society, the mother association of which was started many years ago at Dartmouth, South Devonshire, England, perpetuates in America and Canada, the name, memory, and ideals of Thomas Newcomen (1663-1729), the British pioneer whose valuable contributions in the field of steam engine invention brought him lasting fame, preceding by more than 50 years the brilliant work of James Watt. The Newcomen Engine (circa 1712) is widely hailed as paving the way of the Industrial Revolution of the nineteenth century.

The Newcomen Society in North America was started more than 30 years ago by the late L. F. Loree, then dean of American railroad presidents, which became known as "American Newcomen." Its object centers in the beginnings, growth, development, contributions, and influence of industry, transportation, communication, utilities, mining, agriculture, banking, finance, economics, insurance, education, invention and the law—in short, the background of virtually all substantial contributions to progress of mankind.

American Newcomen through the years has honored numerous pioneering enterprises in the field of communications. And it should interest telephone industry people, generally, to know that Donald C. Power, president of General Telephone Corp., as well as vice president of the USITA, was the guest of honor on Oct. 4. He chose as the subject of his Newcomen address "The Function of the Modern Independent Telephone Company." Delivery of this address was the feature of the evening's program of the Society.

Following his introduction by William N. Enstrom, chairman of the board of The Irving Trust Co., Mr. Power prefaced his remarks as follows:

"The privilege of addressing this international society as a spokesman for the General Telephone System, with which I am associated, is one which I approach with a mixed feeling of both humility and pride.

"I am humble in the thought that whatever our telephone industry in the United States of America has accomplished rests upon the foundation of an earlier heritage which could never have come to pass without the inventive genius so well exemplified by the British pioneer, Thomas Newcomen, from whom this society takes its name.

"And I am proud in the thought that what our telephone business has accomplished has merited the recognition of such a discriminating audience to the extent that you have invited me here to learn more about it."

REA Approves Loans in Three States

The Rural Electrification Administration made loans Oct. 1-5 for the improvement and extension of telephone service in rural areas of Oregon, Minnesota and Texas. The three loans amounted to $410,000, according to the U. S. Department of Agriculture. Details follow:

Beaver Creek (Ore.) Cooperative Telephone Co., $193,000, (Oct. 2). The borrower plans to convert to improve service for 318 rural subscribers, and furnish initial service for 130 rural residents.

It plans to construct an automatic central office about a mile southeast of Beaver Creek. The present Beaver Creek central office will be retained for headquarters. A. A. Hallander is president and manager of the Beaver Creek Cooperative Telephone Co.

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Halstad (Minn.) Telephone Co., $91,000, second loan (Oct. 4). The borrower plans to use these funds, together with the first loan of $494,000, to provide improved service for 999 present subscribers and initial service to 180 new subscribers in Minnesota and North Dakota. The existing subscribers include 99 now receiving magneto service from the Fisher Telephone Co., and from North Dakota facilities of the Pioneer Telephone Co. of Waconia, which the borrower proposes to acquire.

The cooperative-type company plans to construct automatic central offices at Bygland, Climax, Fisher, Halstad, Nielsville and Shelly. The Halstad building will house headquarters facilities as well as central office equipment.

Thomas A. Letness is president and C. G. Snustad is manager of the Halstad cooperative.

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Etex Telephone Cooperative, Gilmer, Tex.; $126,000, second loan (Oct. 4). The borrower plans to use these funds, together with a portion of the first REA loan, to provide dial service for 532 farm families who do not have telephones and for 288 existing subscribers.

As a nucleus for expanded service, the borrower plans to acquire the Harleton and Ore City exchanges now providing magneto service to 288 rural subscribers. These exchanges are now owned and operated by M. O. and Mattie Ordice Wommack. The cooperative plans to construct 256 miles of line and automatic offices at Harleton and Ore City. When completed, this section of the Etex system will serve 820 rural subscribers.

The two REA loans, totaling $791,000, will make possible new and improved service to 1,674 rural subscribers. Three automatic offices, Bettie, Pritchett, and Rosewood are already in operation.

Welby Garlock is president and James M. Whitworth is manager of the Etex Telephone Cooperative.

In his address, Mr. Power referred to the debt which the communications industry owes to the industrial revolution. He pointed out that from the dawn of history until the first demonstration of Morse's telegraph in 1844, "no message or messenger could ever surpass the speed or distance of the transporting vehicle or vessel." He referred also to the "explosive character of the dynamic growth of telephone service in this country," which has increased as much during the past decade, as during the entire preceding seven decades following Bell's invention of the voice telephone in 1876.

He then used a rather original expression to describe the status of the telephone industry in the United States. He called it the "regulated competitive system," as distinguished from the word "monopoly" so often used in this respect. Explaining this term, Mr. Power pointed out that, aside from the division of responsibility by service areas, telephone companies must compete with each other and with all other business in virtually every other aspect of operations (financing, employment, construction, etc.). He also referred to the unusual relationship which has grown up in the United States between Bell and Independent companies. He said on this point:

"Independent telephony, in the past, has well served this nation and the telephone industry as a whole. There is serious doubt that the telephone industry of the United States could ever have developed to its present commanding position of rendering the best

service in the world to more people in its service area, than in all the rest of the world combined, without the contribution of Independent telephony.

"Certainly there is no comparable setup anywhere else under which the operations of one large business organization are complemented harmoniously by smaller independent company operations.

"Without the Independents, there could have resulted a single stagnant national service area monopoly—a target of political suspicion if not a temptation for socialism, which has taken over the telephone business in so many other lands.

"On the other hand, if our telephone industry had been balkanized into a multiplicity of local area corporations, there could not have developed the smooth and efficient, nationwide coordinated telephone service which we enjoy today in this country."

The main part of Mr. Power's speech was given over to a description of the foundation and development of "the Independent telephone industry in general, and the General Telephone System in particular."

Using the General Telephone System primarily as an example, because it was the organization which he naturally knew most about, Power pointed out that each of several major steps and changes in the General system which have occurred during its history to date, were dictated by changing events. He added that Independent companies, generally, must trim their sails and constantly adjust their course to cope with these changing events. As an example of getting the most benefit out of a system-wide organization, from the standpoint of publicity and prestige, he referred to "one of the biggest birthday parties in the history of corporate enterprise in the United States"—Apr. 10, 1952, when all of the companies in the system were rechristened with the name "General Telephone," followed by the area designation. He said on this point:

"This may seem to some like a relatively superficial thing. Shakespeare in his *Romeo and Juliet* asked the somewhat cynical question: 'What's in a name? that which we call a rose by any other name would smell as sweet.'

"With us, it was not a question of calling a rose by another name. Rather it was the appropriation of the rose's name, smell, and every other desirable quality, and spreading them all over our entire system.

"That change was the most fortunate thing we ever did in terms of gaining recognition for the company. It compelled that recognition, by the sheer cumulative force of repetition and association with good and reliable telephone service throughout the entire system."

Power told the Newcomen Society of various other opportunities which the Independent telephone industry, generally, has gained for improving its position and rendering greater public service, especially in view of the sharp uptrend of population and growth toward independent service territory in recent years. He concluded:

"Times change and business organizations, like all other human institutions, must change to conform. We, of the General Telephone System, believe that independent telephony is destined to play an even greater and more responsible role in the future of the telephone industry. To that end we have charted our course.

"We believe that an abiding faith in the future builds a firm foundation for our present. Thomas Newcomen's contemporary, that great British essayist, Joseph Addison, once posed the facetious question: *What has posterity ever done for us, that we should do anything for posterity?*

"Perhaps the best answer is: Let us take good care of the future and the future will take good care of us."

In the final words of his address, Power referred to the Latin motto of the Newcomen Society (*"Actorum Memores simul affectamus Agenda!"*) and said that it might well serve as a guiding principle for the telephone industry: "For it has been from *the lessons of past achievements* in the telephone industry that we, of the General Telephone System, have been moved to lay our plans *for the future!*"

The Electronic Future

Telephone companies and other utilities got an eye opener as well as an ear filler at the banquet given at the Waldorf-Astoria Hotel in New York city, earlier this month, for David Sarnoff, chairman of the board of Radio Corp. of America. The dinner was in honor of his 50 years of service in radio, television, and electronics. Sarnoff's life is a modern saga of American business success. It is a story of the rise of an immigrant messenger boy to the head of a billion-dollar business.

But it was General Sarnoff's predictions for the future, rather than his accomplishments in the past, which were of interest to the public utility industries. At age sixty-five, when most men retire, Sarnoff is as full of young ideas as ever—electronically at least. At his anniversary ceremony he had 20 predictions for the next 20 years. Some of them may seem illusory. But based on past performance, a good many of them are likely to pan out.

In addition, Sarnoff gave a preview of three actual models of important electronic equipment which were unveiled the next day, at the Sarnoff Research Center in Princeton, N. J. One was a home television with a magnetic tape playback. This machine, of about the same size and simplicity as a TV receiver, can be aimed at an ordinary TV set (whether color or black and white) and make a relatively permanent record on tape of any program which comes over the air.

If a social engagement prevents you from seeing your favorite TV program when it is telecast, the tape recorder will preserve it for you for the next day, or a month later, or whenever you want to look at it. It can also be used to put home movies (both sight and sound) on tape.

The second marvel unveiled at Princeton (and this should make the gas and electric companies sit up and take notice) was an electronic refrigerator. It is composed of no moving parts, and hence no maintenance or noise. Since no air is moving, there is no draft. It can be applied to room cooling as well as confined refrigeration. And by reversing the cooling wall panel (6x7x7 feet) it can be turned into radiation heating.

The third marvel was an electronic wafer directly amplifying (about 1,000 times) a dim image projected on its back. Its special application is said to be in the field of industrial X-rays where motion is not important. This is because the image persists for several seconds after the projection.

These three items were demonstrated at Princeton, N. J. But it was explained that they are not yet ready for market, and General Sarnoff guessed that they would not be ready for five years. No cost figures were given.

In his 20 predictions, Sarnoff ranged over the whole field of electronics and automation as they will affect the future life of America. He predicted communication by television in full color simultaneously all around the world. He predicted two-way private telephone conversations with the callers at both ends being able to see each other as they talked, regardless of the distance between. This project is hardly new; such equipment has already been successfully demonstrated in telephone industry experiments.

He predicted plentiful nuclear energy not only for industry but for trains, planes, ships, and automobiles. He predicted the direct harnessing of the sun's rays (solar heating). Jet propulsion and rocket transport at speeds as great as 5,000 miles an hour.

He predicted that electronic computers would take over the recording and accounting tasks now performed by 9 million American clerical helpers. The housewife will have an all-auto-

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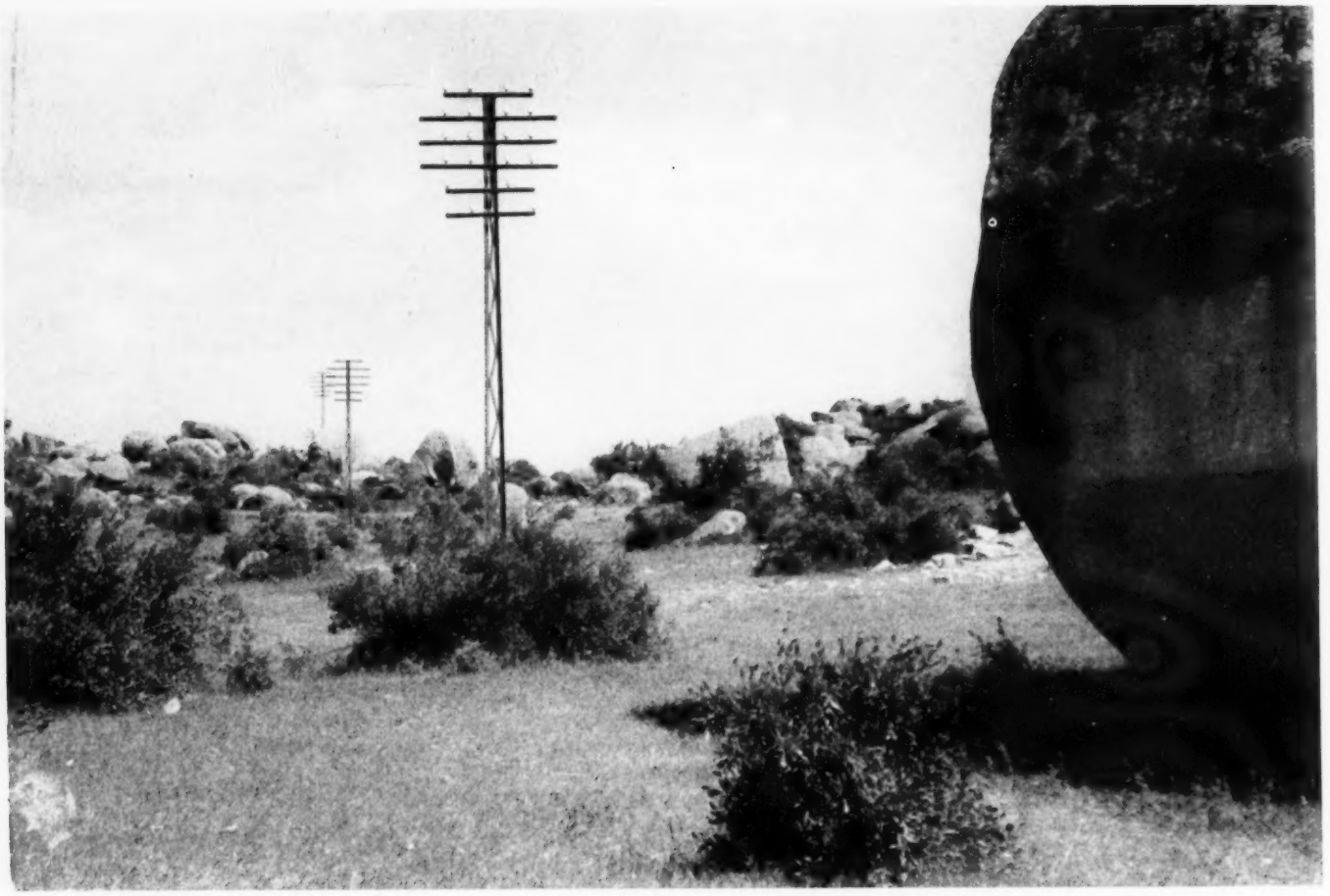

Italian built pole line in Ethiopia—iron poles with angle iron crossarms. Poles are set in concrete.

Through Europe and Middle East By Plane

By RAY BLAIN

Part 2

WE LEFT Paris by boarding a MATS DC-6B from Orly Field and went back to Frankfort, Germany. After spending a pleasant weekend in that industrial city, we boarded a Convair of Italian Airlines and after a flight of about two hours over the Alps we landed at Milan, Italy. After clearing customs and buying some lire, we boarded a bus for an hours ride into Milan. The greater part of this distance was over a toll turnpike—a very good road—but there were wayside billboards on an average of each 50 feet for the entire distance. The traffic travels on the right side of the road in Italy just as ours does, but for some reason all buses and trucks are right-hand drive. I was never able to obtain an explanation of this except perhaps that these vehicles are purchased in England where the traffic takes the left-hand side of the street.

In Milan, we took a cab to the railroad station and learned that we had a wait of about two hours before we could catch a train for Verona, Italy. We bought our ticket and went across the street to a sidewalk cafe where we ate a leisurely lunch. This is a beautiful city and we were sorry to leave it so soon. The streets in some sections are lined with flowering shrubs. The policemen were all in snow white uniforms and wore sun helmets. No one seemed to get in a hurry unless they were on one of the numerous motor scooters. Someone told us that an Italian never gets in a hurry until you put wheels of any kind under him.

Finally, the train came in and we found an empty compartment and got aboard. These trains now have only first and second class service, as the third class has been discontinued. The trains are comfortable and make good time, but they were extremely hot. There was no air conditioning, even in the diner, and the small compartments certainly do not contribute anything to good ventilation. After a hot ride of about two hours we arrived at Verona, a city 68 miles from Venice, that was founded in the fourth century, BC.

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We soon got settled for the night in a good hotel after we had deposited our passports with the clerk. I believe the reason for this is so that the hotel can make out their records and may check with the police. Here we had a delicious though inexpensive dinner in an outside dining room. Our room did not have a bath so it was necessary to arrange for one on our floor. Here, also, the bath towels were about 4 by 8 feet. I never could understand why they should be so large.

I tried to turn on a bedside lamp and in so doing I pressed a button arrangement on a cord which did nothing to the light. Soon there was a frantic knocking at the door and when I opened it there was a maid and two men making loud noises in Italian and peculiar motions with their hands. I finally got rid of them when I pointed to the button and showed them that the light would not turn on. They smiled and nodded knowingly and went away, but nothing was done about the light. I later found that one button called the chambermaid, another a waiter, and the third a valet. This same arrangement was found later in various hotels that cater to the international trade, which made use of an understandable sign language. One button had a picture on it of a waiter carrying a tray, another picturing a maid with a duster, and the third, pictured a man carrying a pair of shoes. You don't have to speak the language to get service in these hotels—you just have to pay for it.

Verona is a beautiful and interesting city and I would have enjoyed spending more time there. The old Roman amphitheater is partly in ruins, though some repairs have been made on it in recent years. It seats 25,000 people. The acoustics, it is said, are nearly perfect and it is used to stage spectacular operas. The stage is so large that elephants, cars, chariot races, etc., may be accommodated without difficulty. Here, also, we hired a taxi and went out to view and photograph the balcony from which Juliet made eyes at Romeo. Strange to say, we were not required to pay admission to this historic spot.

A French information operator.

We left Verona by train and had to change at Bologna and Florence before arriving at Leghorn. This is a nice little city, called Livorno by the Italians, and it is their third largest port on the Mediterranean. This is only a few miles from Pisa, but time did not permit our having a look at the Leaning Tower.

We left Leghorn by train and after a ride of about four hours in a good electric train we arrived in Rome. There were many long tunnels through mountainous regions on this run. This train was also hot and we missed air conditioning.

The Italians are apparently a very industrious race. They farm small plots by primitive methods and evidently production is high. This is true especially in the north, but, farther south toward Rome the soil appears to be less fertile and there the fields are larger and some farm machinery and tractors are used.

Rome is a most interesting city and I was sorry to leave after only a stay of one day. I did, however, get a night tour and saw several interesting and historical spots. We visited a night club which is the converted villa of one of Mussolini's girl friends. It was a beautiful spot on the top of one of the seven of Rome's hills.

We left Rome for Athens, Greece, on a TWA Super "G" Constellation. This was an easy flight of two hours' duration. The plane was manned by a French crew and the service was excellent. TWA appears to be quite a power throughout Europe and from all indications it employs local talent wherever it is possible to do so.

The Greeks are obviously living in the glories of their past. They also get terribly excited if you mention Cyprus. They are, however, hard working people and crime is practically unknown. It is claimed that Athens has never had a bank robbery. Policemen are standing everywhere and I could never understand what they are supposed to do. I asked a Greek friend why they had so many and he told me: "During your great depression you had your PWA, and in Athens we have our police department."

In Athens, people walk haphazardly in the streets despite the jumble of cars, trucks, busses and street cars. An American GI stated that Athens is claimed to be the Cradle of Civilization and that the Greeks have never been able to get out of it. However, that is the opinion of only one GI with an American sense of humor.

Toll line in Germany. Poles are guyed frequently, with "H" and "A" type fixtures used extensively.

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Here, also, ruins are prized and preserved. We visited and photographed the ruins of the Acropolis and the Parthenon that was completed 438 BC. It was destroyed in 1687 by the explosion of a Turk powder magazine. This was a fascinating sight and we thoroughly enjoyed the several hours devoted to the trip to the mountain top.

In Athens, one finds few "bikes" or motor scooters on the streets as practically everyone drives American automobiles. Never before have I seen so many things constructed out of beautiful marble. The stairs in our hotel were made up of white and black marble and were beautiful to behold. Even the baseboards in the rooms are white marble as also are many of the floors. In the kitchen, the sinks are made by carving out a cavity of suitable size from a large chunk of white marble. It is understood, however, that with sinks of this type the dish casualty is extremely high. The restaurant lighting is always bright and dazzling. I could not determine why, but the Greeks seem to like it.

In Athens there are numerous street booths that sell practically everything. I bought a copy of the *Saturday Evening Post* in one of these booths. It cost me 12 Drachmas, or about 36 cents in our money. I noticed the sign KOLYNOS on many of these booths. I asked a native what this word meant in Greek and he said "tooth paste." I got a good hair cut in a first-class barber shop in Athens for 24 cents. The barber took the 15 cent tip I gave him without argument.

We drove out of Athens and I commented on a large grove of olive trees that looked rather old. We asked our guide why they were not replaced with new trees. He explained that an olive tree does not begin to bear until after the 12th season. For that reason, they have a long productive life. He claimed further that the trees in question were planted about 400BC. Perhaps he was telling the truth, but we will never know.

We flew from Athens to Ankara, Turkey, with MATS in a DC-4. This was a smooth flight of about two hours. En route we went up to the flight deck and were permitted to listen in on the radio and also received an explanation of how the radar is used to provide greater safety in flight.

The Turkish people are very friendly to Americans and they are making great strides toward a better way of life. At the present time, they are making a supreme effort to modernize, but they have a lot to learn and a long way to go. The Turkish national hero, Ataturk, when he was alive, outlawed the fez for men and the veil face covering for women. It must be admitted though that some of the women would look better with the face covered. Men, not even Turkish shriners, could legally wear a fez in these days and times. In Egypt things are quite different as men of all faiths, whether shriners or not, can wear the fez if they so choose. Many of them do wear this colorful head dress.

Women in Turkey must surely live a sheltered life as you seldom see them in public places. We dined one evening in a large outdoor restaurant where there were 300 or more men and I could count only three women. Seldom are they seen on the streets, in shops, etc.

I visited the offices of an official of the Postal, Telephone and Telegraph Department of the Turkish Government. I accompanied a friend who was negotiating a contract with this department. After much discussion, the contract was signed and the Turkish official leaned back smiling and said now we shall have some coffee. A little old lady dressed in black with a black veil around her head, but no covering on the face, came in to serve us. I was asked whether I would have Turkish or French coffee. I thought it would be the patriotic thing to do, so asked for Turkish. It was served in a very small cup and was so thick that you could practically cut it with a knife. I drank it with some effort, but it tasted very little like coffee as we know it.

Time did not permit me to see much in the way of communications in Turkey. We visited a radio station about 25 miles from Ankara that is served by an underground power cable over this distance from the city power station. The airport, about 20 miles from town in another direction, is served by a 50-pair underground telephone cable for the total distance. We also saw an open wire telephone line under construction, which we were told is a part of the NATO program. Radiotelephone communication is available from Ankara to New York during certain hours of the day.

Big herds of sheep and goats are a common sight in Turkey. Horse-drawn vehicles are numerous. Also, small burrows are so loaded down that one wonders how they can ever carry on. Then, a big Turk jumps on top of the load and the small burrow trots down the road.

Prices are most reasonable in Turkey by our money values. For example, I got a good room with bath in a new hotel for $1.20 a day. The service was not the best, but the Turks are most willing. Tell them what you want and they will try to give it to you. Prayers over a loudspeaker located on the minarets of a nearby Mosque waken you each morning at daybreak. The Turks never worry. If anything goes wrong, he just sits down and says, "Allah will take care of everything." Perhaps his philosophy is good and if we had the same attitude we would not lose so many of our great men with heart attacks at earlier ages.

We left Ankara on a DC-3 of the Turkish Airlines. The Turkish hostess served us a nice lunch in flight. A small package of Turkish cheese carried a picture of a cow and the word TEXAS. I guess they have heard of the many cows in Texas and naturally supposed that they make cheese. I told her cheese came from Wisconsin, but apparently it did not register. After a smooth flight of about two hours we landed at Istanbul, Turkey. We had a good look at the Bosporus from the air, but because of a ground haze did not get a good picture of it.

We had only about a two-hour wait at Istanbul and then left for Athens on a Viscount operated by British European Airlines. This was the only foreign manufactured aircraft on which we traveled during the entire trip. After a smooth flight of two hours, we landed in Athens without incident.

After a layover of several hours in Athens we boarded a Convair of the Ethiopian Airlines for our flight to Asmara, Ethiopia. This is a very good little airplane using American pilots and Ethiopian co-pilots. The hostess on our flight was a Greek, but she could speak excellent English. TWA also has something to do with the management and operation of this airline. On this flight we passed over Alexandria and made a stop at Cairo, Egypt. We also made a fueling stop at Port Sudan on the Red Sea. We left the air conditioned plane and went out into the heat of 130° F. at this point which proved quite a shock. The air strip here is sand and pieces of corrugated roofing outline the runway boundaries. Asmara is about 7,600 feet above sea level. As we approached this plateau with clouds overhead, I wondered how the pilot would land. I need not have feared, however, for he slid in beneath the clouds and landed without difficulty.

Ethiopia covers 350,000 square miles in eastern Africa, just below the Red Sea and slightly north of the equator. Situated as it is, for the most part, atop a vast plateau having an elevation of 8,000 feet and traversed by the Great Rift Valley and numberless valleys and gorges thousands of feet deep, it has a wealth of beautiful scenery. Ethiopia has the finest climate in all Africa because of its high mountain

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plateaus, even though it borders the equator. Mild days and cool nights are the rule. The average temperature is 62° F., but higher and lower averages are found in the deserts and higher mountainous areas.

The Ethiopians are a proud people, and are making great progress toward improving their place in the sun. They claim that they are descendants of King Solomon and the Queen of Sheba. English is now taught in the schools and I had no difficulty talking to the small fry. In fact, many times they proved most useful as interpreters.

Due to the kindness of friends, I was able to make Jeep trips of over 200 kilometers out into the country side. We visited the port of Massawa on the Red Sea and saw mountainous and desert areas. Asmara is situated in an area that was formerly occupied by the Italians and known as Eritrea. Good roads were constructed by the Italians throughout this area. There is also an aerial tramway, not in use, from Asmara to Massawa, a distance of over 100 kilometers. Telephone lines are excellent, open wire on iron poles set in huge slabs of concrete. They used some form of communication sleeve similar to ours. Perhaps they were purchased in this country. This line would cost a fortune to construct today.

I had the pleasure of visiting the telephone exchange in Asmara. Here, we met Olle Edstrom of Sweden, an engineer serving the Ethiopian government on contract. This exchange is of the Strowger type and we understand was manufactured in Chicago. It is greatly overloaded and we were told that a new and larger exchange is being considered. We were advised that an average of 35 originating calls on each line daily is not uncommon in this exchange.

It is most amusing to watch camel caravans pass through Asmara. The camel herders do not know just what to make of the traffic lights. Generally, they will start out on any color, get to the center of the street, and then stop in bewilderment. They get traffic all snarled up and the police have to come in and restore order.

Take a country road in any direction and you will meet camel caravans, people on foot loaded down, some pulling small wagons, and burrows loaded with all kinds of commodities. Stop the car even in the wildest region and you will soon be surrounded by a crowd of friendly barefoot, but smiling, natives.

I went into a bar in Asmara one afternoon as I had heard that they sold American Coca-Cola. I struck up a conversation with an Ethiopian bartender who spoke fairly good English.

Telephone in author's Paris hotel room. It's probably as old as the antique stand on which it rests.

He wanted to know how many wives I had and I told him a very good *one*. Then he asked how many bambinos and I showed him the picture of our dogs. He showed two rows of very white teeth and said, "You Americans—all rich and stingy." He then explained that I could afford many wives and many bambinos. I then asked him how many wives he had. He claimed that he was a very poor man and could afford only three wives and five bambinos. He told me that the other bartender who made more money than he did had nine wives and 15 bambinos.

In leaving Asmara I traveled by Ethiopian Airlines and when we landed at Port Sudan one engine was so hot that it would not stop for several minutes. It is understood that this is a common occurrence in that hot climate. We were soon airborne again and landed in Cairo, Egypt, without incident.

When I arrived in Cairo I expected to find everything foreign and peculiar. Much to my surprise I rode from the airport to the hotel in a Dodge taxi. At the hotel I started into what I supposed was the dining room and landed in a Rotary meeting. The headwaiter saw my plight and directed me to the main dining room. The next morning I hired a guide and went out to see the Pyramids of Giza in a Plymouth taxi. On the way, we passed an Egyptian army motor convoy made up of old International and Chevrolet trucks and led by a Willys Jeep.

Practically everyone I met in Egypt could speak, at least, some English. The guide, who showed me the Pyramids and taught me to ride a camel, spoke excellent English which he said he learned in an American missionary school. He did not state, though, who taught him robbery. At the hotel, they did not give me the key to my room. I would take the lift to my floor, push a button on the wall and a boy would come and unlock my room. There was a manual telephone in my room and it rang twice during the night asking for someone whom I had never heard of before. The Egyptian army is training recruits everywhere you look in Cairo.

I left Europe by TWA with stops at Athens, Rome, Paris, Gander Airbase, Newfoundland, and then little old New York. I cleared customs at Idlewild Airport and caught an Eastern Airlines Constellation for Washington.

Observing the manners and customs of foreigners can prove most amusing. In the various countries we visited, outdoor and sidewalk cafes are very popular. They do not seem to have the bugs and gnats that are attracted by light at night as we do. We enjoyed these outdoor cafes and on one cool night in Berlin we were surprised to learn that the table top was heated electrically. Europeans all eat with the knife in one hand and the fork in the other. They seldom lay either down during the course of the meal. They consider Americans foolish and claim that we lose a lot of time by laying our knife or fork down and eating with one hand. They seldom serve water or bread and butter with a meal unless you ask for it. In serving wine, the waiter always places a sample before the host for approval before the others in the party are served.

Strange monies present a problem to many Americans traveling in foreign countries. I found that the easiest method was first to figure out what the money was worth in our dollars and then spend it accordingly. The U. S. Military in some parts of Europe use MPC, or Military Payment Certificates, to combat the black market. The U. S. dollar during our trip was worth 4.20 Dutche Marks in Germany; 360 Francs in France; 625 Lira in Italy; 30 Drachma in Greece; 10 Lira in Turkey; 2½ dollars in Ethiopia, and one-third of a pound in Egypt. Money was fairly stable in all countries visited with the exception of Turkey and here it fluctuated considerably from day to day.

The scarcity of young men is quite apparent, especially in Germany. The number of young men maimed is also especially quite noticeable. I had several Germans and Italians start up a conversation by recognizing me as an American. They would tell me that they were prisoners of war in the U. S. during the last war. They seemed to enjoy telling me where they had been and how well they were treated. They all expressed a high regard for the United States.

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Transmission Testing

The advent of Direct Distance Dialing brings new significance to transmission problems in telephone plant.

By HAROLD B. McKAY

Part 3

THE TWO PREVIOUS articles in this series explained how transmission measurements are made on telephone circuits. This, the concluding chapter, deals with some specialized tests and "tricks of the trade."

Transmission tests on circuits which do not contain carriers or repeaters are usually made in one direction only. That is, the 1,000-cycle tone source is put on the line at one end and the measurement is made on a db meter at the other end of the line. This is satisfactory because the transmission will be the same in both directions.

Circuits which use repeaters or carriers usually have separate amplifiers for each direction of transmission. Therefore, the transmission can be different in each direction, depending upon the gain setting of the amplifiers. Trunks of this sort should have transmission measurements made in each direction separately.

In cases where trunks without carriers or repeaters terminate in a remote office, it may sometimes be uneconomical to equip that office with transmission measuring equipment. In this event, tests can be made from the main office on a loop basis. These tests call for both the tone source and the meter to be at the main office.

Loop Tests

In making the tests, a call is placed from the main switchboard to the tributary board. At the latter board, the operator is instructed to take a cord pair and patch the trunk to another trunk going back to the main office. If the call is made on trunk A, for instance, the grid sends the call back on trunk B. At the main office, the tester puts tone on trunk A and the db meter on trunk B. This, of course, gives the transmission loss for both trunks together.

In order to get correct readings for each trunk on the board, it is necessary to determine the loss on one trunk which will then become a standard test trunk and to which all the others will be connected for the duration of the test. Any trunk can be used for a standard test trunk by a mathematical trick.

In order to definitely find the loss on a single trunk from one end of the line, proceed as follows:

(1) Send tone on trunk A and measure it as it comes back on trunk B. This is your first reading and is the loss of both trunks, A and B.

(2) Next, send tone on trunk A again, but this time have the distant operator connect trunk A to trunk C. Measure the tone as it comes back on C. This is your second reading and is the combined loss of trunks A and C.

(3) Now, send tone on trunk B, and have it sent back on trunk C. This will give you your third reading, the loss on trunks B and C.

If you add the first two readings together, and subtract the third reading from the total, then divide by two, the answer will be the loss on trunk A alone. This can become a standard, and subtracted from the reading on each of the other trunks as they are looped back, will permit you to find the loss on each trunk, individually, with the tone and the meter at one end of the line.

For example, suppose trunks A and B together read 21 db loss, A and C read 22 db, and B and C read 23 db. Add the 21 and 22 together, and you get 43. Subtract the 23, this gives you 20 which divided by 2 results in 10, which is the loss on trunk A. By subtracting this from the first reading, you can find that trunk B has 11db loss. Another subtraction will show you that trunk C has a 12db loss.

Expressed as an equation, the above computations would look like this:

$$A = \frac{(A \text{ plus } B) \text{ plus } (A \text{ plus } C) \text{ minus } (B \text{ plus } C)}{2}$$

When making tests like this, allowance should be made for losses in other

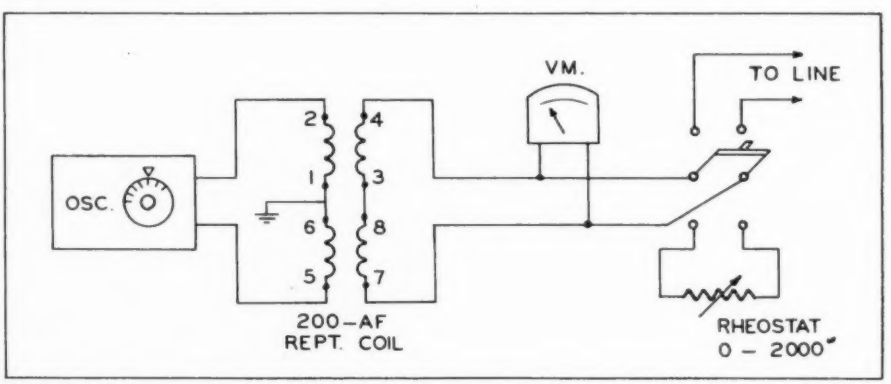

Fig. 3.1. The approximate impedance of a line can be measured with a circuit like this. The reading of the voltmeter is noted when the circuit is connected to the line. The switch is then thrown, and the variable resistance is adjusted to get the same reading. The resistance of the rheostat is then equivalent to the line resistance.—From a Stromberg-Carlson drawing.

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equipment used in the circuit. For instance, trunk relay equipment at each end will have a loss; and the cord pairs used to establish the connections will also have losses. If you want to know what the loss on the wire line alone is, it will be necessary to subtract these other losses from the readings.

While the above example describes switchboard to switchboard tests, the same idea can be extended to a portion of the wire line. That is, a repairman could be sent to a junction pole and asked to loop back one circuit to another by opening them and tying them together with a jumper.

Remote offices with automatic switching arrangements can have test selectors doctored up to provide transmission tests.

Response Testing

Among the useful tests that can be made if you have a variable frequency oscillator and a vacuum tube voltmeter, is that of determining the response characteristic of any piece of telephone apparatus. Take a carrier, for instance. Some manufacturers supply information as to what the gain should be at several different frequencies. This information may take the following form.

When the carrier has been finally adjusted to transmit 1,000 cycles at 0 dbm and this is used as a reference level, then the following should apply:

300 cycles	no more than —9.0 db from ref. level
400 cycles	no more than —4.0 db from ref. level
500 cycles	no more than —2.5 db from ref. level
2500 cycles	no more than —2.5 db from ref. level
2800 cycles	no more than —4.0 db from ref. level
300-3000 cycles	no more than —1.5 db from ref. level

Tests like this are made by sending in tone at these different frequencies and measuring them as they come out of the system at points specified by the manufacturer. From the readings obtained, a curve of the over-all response of the system can be taken. The condition of the equipment is made known at once by comparing the results obtained with the specific values as given in tables like the one above.

Various obscure transmission troubles in both equipment and line will also make themselves known through tests at different frequencies. The location of the trouble can often be determined by analyzing the readings obtained, or by sectionalizing the line or equipment and repeating the tests.

Another useful application is found in connection with loading coils. Perhaps one of the greatest weaknesses in telephone plant today is that of misplaced or wrong type of loading. In theory, the pairs in a cable act like a pair of plates in a condenser, and the longer they stretch out, the more they soak up alternating voice currents. A cable without loading gradually attenuates the voice as its length increases. This effect also increases with frequency. That is, the higher the frequency, the greater the loss from cable capacity.

Loading

When a cable is loaded, coils of wire are placed in series with the pairs at different spots along the line. This is done because the inductance of a coil has the opposite electrical effect to the capacitance of a condenser. Therefore, the load coil will cancel out some of the effects of the losses along the pair.

These coils are placed at specified intervals. For example, cable which has H88 loading has 88 millihenry coils spaced 6,000 feet apart. In theory, the capacitance of 6,000 feet of cable should be cancelled out by 88 millihenries of inductance. Now, it is not always possible to place load coils at exactly the 6,000-foot mark. The right spot might turn out to be in the middle of a river.

So, coils are often placed in a location which is not electrically correct. When this is the case, if the coil is too near, it "overcancels" and gives a surplus of inductance, which makes it act as a choke coil in the line. This is just as bad as too much capacitance which is the effect you get if the coil is too far away. Problems like this become complicated when two pairs are tied together at an intermediate central office. Each may have a different loading pattern, and the transmission on the two pairs together can be much worse than the total loss of each of the pairs tested individually.

While spacing of coils can usually be determined from company records, the net effect of mis-located coils may not always be apparent to a person without transmission engineering experience. Further, the loading coil cases have been known to be mislabelled, and the wrong size coils have been connected into plant.

Cable Characteristics

The transmission characteristics of loaded cable can be probed by the use of the variable frequency oscillator and the voltmeter. All loaded cables have a cut-off point—a frequency at which the loading is no longer effective, and the transmission drops off. This will vary widely with the type of cable and loading and may be anywhere from 2,800 to 5,900 cycles. The actual cut-off frequency for any given type of cable and loading should be obtainable from the manufacturers of the cable and coils.

In testing, a series of measurements are made at different frequencies below the cut-off frequency. A comparison between good pairs and improperly loaded pairs will show that a missing or mislocated coil will cause a drop off in response at a lower frequency than when the coil is correctly located.

Inasmuch as the purpose of loading is to offset the loss caused by length and rising frequency, any deficiency in that function will show up as an excessive loss.

Impedance Measurements

The impedance of a line has been often called the ac resistance. This is a handy way of thinking about it, but it does not tell the whole story. The impedance of any circuit is the result of both the resistance and reactance present. Reactance occurs when there is capacitance or inductance on the line. Every piece of wire has a tiny bit of capacitance and inductance. If the line is long enough, this can amount to a large quantity. However, a line of definite construction, that is, of a certain gauge and spacing will have a "characteristic impedance" which is distributed along its length. This impedance, if thought of as ac resistance, will determine how the line will take power from an ac source such as voice or carrier. This characteristic impedance will be the same regardless of the length of the line. (A simplified explanation of the action of coils and condensers can be found in "Electrical Principles Used in Carrier Systems," a reprint available from TELEPHONY.)

Now, because the capacity on the line tends to retard the voltage, and the inductance tends to retard the amperage, the voltage and amperage may not be in step with each other along the line. This is called a difference in phase. It is also referred to as phase shift, and the amount of difference between the timing of the voltage and amperage is the phase angle. The loading coil achieves its results by slowing down the current to match the pace of the voltage which was slowed down by the capacitance of the preceding cable section.

Now, no measurement of impedance tells the whole story unless this phase angle is considered, but for many purposes it can be ignored. If it must be measured, rather elaborate measuring equipment is required, however, a method of measuring impedance which engineers like to call "quick and dirty" can be made by simple means. *Fig. 3.1* shows a means of hooking up an oscillator and a voltmeter. The oscillator should cover the frequency at which it

is desired to make the tests. The voltmeter should be sensitive enough to measure the amount of voltage being handled, and should respond to the frequency of the oscillator. (A good volt-ohm-milliameter of the type shown in part one of this article (TELEPHONY, Oct. 6) would work at voice and low carrier frequencies. A vacuum tube voltmeter would work for everything a telephone man would need.)

In making the measurement, the instruments are connected to the line as shown and a reading taken. The equipment is then removed from the line and connected to a variable resistance. The resistance is changed until you get the same reading as you did on the line. The resistance is then measured with a dc ohmmeter. The result is the effective impedance of the line. This test does not reveal such things as phase angle, standing waves, and reflections from mismatched junctions in the line; but is of sufficient value to permit matching a carrier to the line under test.

Condenser Measurements

An oscillator and a vacuum tube voltmeter can also be used to measure the value of an unknown condenser if you have a condenser of known value to compare it with.

Fig. 3.2 shows how this can be done. The known condenser CK is hooked in series with the unknown C?. The total voltage across the two is then measured. This is called Et. Next measure the voltage across the known condenser. This is called Ek. The voltage across the unknown condenser can be obtained by subtracting the known Ek from the total Et. The result is called E?

The capacitance of the unknown condenser can then be found by the formula

$$C? = (Ck + inst)\ \frac{Ek}{E?}$$

where "inst" is the input capacitance of the vacuum tube voltmeter. This can be ignored if the value of the condenser being measured is large.

Measuring "Q"

In all electrical apparatus, some resistance and some reactance is likely to be found. These two quantities behave quite differently, and the success or failure of a piece of apparatus may depend upon how much resistance there is compared to the reactance. First of all, resistance means power dissipation. That is, when electricity goes through a resistance, it is changed to something else. It may be light in the case of a lamp, and it may be heat in the case of a heater. In any event, the electricity which goes into a resistance is used up.

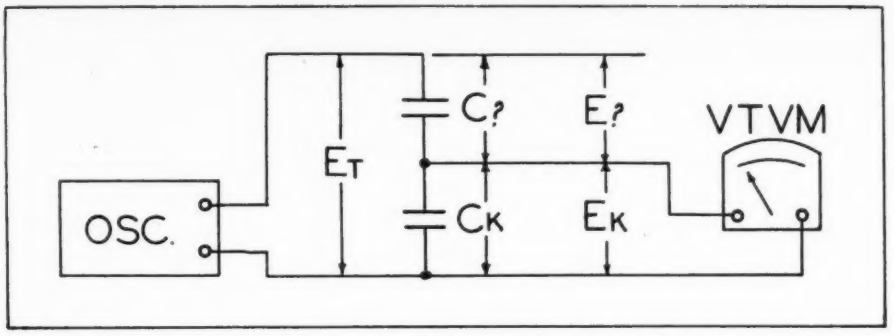

Fig. 3.2. The value of unknown condenser C? can be found from the formula $C? = (Ck + inst)\ \frac{Ek}{E?}$, where "inst" is the input capacitance of the voltmeter, Et is the total voltage, Ck is a known condenser, Ek is the voltage across it, and E? is the voltage across the unknown condenser.—From a Hewlett-Packard drawing.

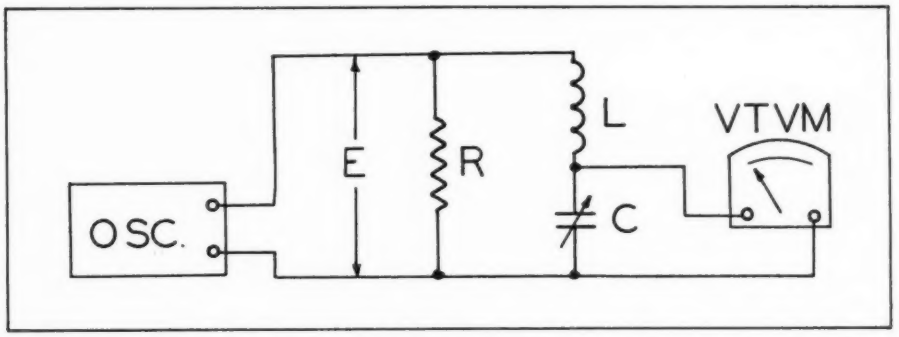

Fig 3.3. This is the set-up for finding out the Q of coil L. R is about .1 ohm, C is large compared to the capacity of vtvm. The Q of the coil equals the voltage at resonance across the condenser, divided by the voltage across the resistance. C is tuned for maximum reading on the meter.—From a Hewlett-Packard drawing.

On the other hand, when electricity goes into a condenser and charges it, the electricity can be removed when the condenser discharges. Similarly, an inductance takes current when voltage is applied, but it will give a kick-back of current when the voltage is removed. This is what causes relay contacts to spark.

Now, in a lamp or heater, resistance is a good thing to have because you want to convert electricity into light or heat. Reactance you don't want because with reactance in a circuit, the power drawn in one-half the cycle is returned to the line on the next half cycle without being used.

In a carrier filter, coils and condensers are used to tune to certain channel frequencies, to by-pass unwanted frequencies, etc. Here we want reactance, because it is reactance that tunes to the frequencies wanted. Resistance is no good, because it wastes telephone power. A good coil, then, must be designed so that its reactance is high compared to its resistance. Resistance it must have because the wire it is wound with has resistance, but the reactance can be controlled by the method of winding, the insulation, and the material in the core.

The final result, the comparison of the resistance, and the reactance of the coil has been called a figure of merit because it tells how efficient the coil is. It is designated by the letter "Q."

The Q of a coil has to be measured with a hook-up like that shown in *Fig. 3.3*. The resistor R should be of low value, about 1/100 of what the anticipated resistance of the LC circuit will be. One-tenth of an ohm will be average. In use the oscillator is set to the frequency desired, and the output set so that the voltage across R is some small even number such as .01 volt. The LC circuit is adjusted to resonance by tuning the condenser for maximum reading.

At resonance, the voltage across the inductance equals Q times E. Where E is the oscillator voltage, Q can be found from the formula

$$Q = \frac{\text{Resonant Voltage Across Condenser}}{\text{Voltage Across Resistor}}$$

In making this test, the oscillator should be matched by a transformer or otherwise to the low value of R. The variable condenser should be large compared to the input capacitance of the voltmeter.

This is the last article of this series on transmission testing. Has this information proved of value to you? Would you like to see more material on this subject and allied topics? Please drop a card to the editors of TELEPHONY and tell us.

XUM

So You've Invested in Modern Plant

NOW WHAT?

By **WELLINGTON POWELL**

I WOULD like to approach the questions and problems implicit in the title of this talk first from the standpoint of where we are today in the telephone business. I'd like to talk with you concerning a few of our common problems and finally I'd like to touch on some of the developments we see on the horizon—the type of developments which we believe will be instrumental in helping our industry to stay modern. We must remember that the telephone art is moving at a terrific pace—so much so that even some of the most modern equipment we are installing today is obsolete by laboratory standards.

We must also remember that the plant of the future is going to require technical and administrative skills on the part of management which will be totally new and which will pose many challenging training problems in developing tomorrow's telephone leaders.

All of us have had the common problems incident to the wartime period when we just had to make do—when we had to give service on a priority basis and had to meet our essential obligations under conditions involving extreme shortages of both materiel and manpower. The postwar period ushered in an expansion of our national economy which dwarfed those of all other such periods in the whole history of these dynamic United States.

Could Not Give Service

Like Alice in Wonderland, it was a case of running faster and faster to stand still. Unfortunately—even with unprecedented construction programs, with ever expanding telephone forces, with ever increasing amounts of capital investment—we found it impossible to fully meet telephone demand. We were faced with the situation, however much we disliked it, where we had to tell many customers we simply could give them no service.

In many other cases, the customer had to accept a service of lower grade than he would choose—and wait until such time as facilities were available to give him the kind of service he desired. Each of us, having gone through this wonderful, but trying, postwar period, should find gratification and assurance when we survey our situation today.

While we still have some held orders and some held regrades, their numbers have been greatly reduced and —what is more important—we can look forward to their disappearance in foreseeable future. I think it is fair to say that the communications people of New York State have risen to the postwar challenge of providing service and, through courage, ingenuity, and the will to do, they have performed the task in a manner which needs no apology.

One of our serious, current problems is that of obtaining and developing adequate numbers of management people to assure the healthy continuity of the business. From personal contacts with some of you folks, I gather that we don't have exclusive ownership of this particular problem. It's a problem which demands and certainly merits our best efforts and thinking. Happily, it can be made to yield to such efforts in the forms of good recruiting and good training and development programs. For the sake of emphasis, I would again lay great stress on this matter because if we fail here, the modern plant of today, or even the modern plant of tomorrow, will not save us from failure in our efforts to achieve our primary goal—service to the customer.

Inflation Big Problem

While all of us have solved many of the postwar problems of giving service, we have been notably unsuccessful in dealing with one major problem of the past decade — inflation! Each of us knows that our 100-cent dollar of the prewar era has been reduced, through postwar inflation, to the 50-cent dollar of today. We've all had this problem in common.

While unregulated business has compensated for inflation through price increases, we in the regulated businesses, have been afforded scant relief from this source. I don't propose to go into any detail on our rate problem. Each of us, I know, is painfully aware of the general problem in his own company. Like you, we have been before the commission and the courts a good proportion of the time in recent years trying to recover expenses, or trying to have proper recognition of the value of our plant in the light of today's inflated dollar.

Each of us has a vital stake in the matter of adequate earnings. In the long run, it is also in the best interests of your customers, and ours, that each of us be permitted adequate earnings —earnings that are above the bare minimum. There is good reason and logic behind this point of view, and I'd like to dwell on it for just a few moments.

We know that today all over the

Mr. Powell is vice president (operations) of New York Telephone Co. He gave this address at the recent convention of the New York State Telephone Association.

United States the standard of living is at an all-time high. This situation is not accidental. Each of us knows that it arises from competition under the free enterprise system.

Competition itself brings about the risk-taking by American business men which has initiated growth, and the innovations which alone can maintain the economy at a high level, or keep it moving upward.

Every business decision involves risks which may return profits or losses. Fundamentally, however, changes are initiated and risks are taken with the objective of achieving profits. Those changes and innovations are made under the pressures of competition and, over the long-pull, they result in the consumer getting more for his dollar.

There Is Competition

There is an indication, not without significance, that many of the unregulated companies which have taken the greatest risks in the postwar era, as judged by plant growth and sales growth, are those with the higher margins of profit—and the greatest value in their products to the consumer, for his dollar.

In our businesses, regulation has been substituted for selling competition, for reasons which we all understand and approve. However, it would indeed be a mistake for you or me to assume that we are not in a competitive field. And it would be a costly mistake, too. We are in fact engaged in the keenest of competition. We are not only competing for our share of the consumer's dollar, but we are also in competition for construction dollars, where we compete directly with other industries. Those of us who may be engaged from time to time in seeking capital, fully understand this type of competition.

It has been clearly demonstrated in the postwar period of expanding national prosperity that the price of an object, while still a major factor, is secondary in the consumer's mind to quality, product improvement, and new developments.

Certainly, in the case of automobiles, household appliances, foods, and for that matter, telephone service, the majority of consumers have indicated by their buying that they have more interest in better grades, higher quality and deluxe models than in minimum products at the lowest possible price. And, in thus supporting the expansions of the industries which supply more and better services and products, they are, in the long run receiving more and better products and services for their dollar.

The company whose prospects of profits are constantly at the bare bones minimum is not generally going to be in the best position to take the risks of making changes, or introducing innovations—either because it cannot afford to risk a loss, or perhaps because it cannot attract on favorable enough terms the necessary capital to pay for such changes and innovations.

Earnings Favor Customer

My point is, that in the long-run, it is to our customer's best interests that each of our companies be permitted to

WELLINGTON POWELL

earn at a rate reasonably above the bare minimum toward which we have trended. And further, this can well be achieved by the regulatory bodies within the existing legal framework by permitting a profit above the levels prescribed in the past, not solely as a reward for managerial efficiency but more importantly to recognize and encourage the risk-taking involved in accelerated expansion and innovation.

The rewards of a more enlightened attitude are bound to be great from the long-range view of our customers —better service at lower costs than would otherwise obtain.

The prospects for the future, technologically, are bright indeed, if we can keep our companies in sufficiently good financial health to exploit them.

I'd like to talk about some of these possibilities. Our technical progress in the past has been spearheaded by two devices, the electromagnetic relay and the vacuum tube. The relay, a hardy workhorse, handled the complicated job of interconnecting telephone lines, so that you can be connected with the one person you want among the millions of others.

The vacuum tube, another faithful servant, made it possible to extend transmission to ever greater distances —to reach out across continents, and even vast oceans.

Now we are at the start of an exciting new era. It is opening as the result of one of those big breakthroughs in science which come at rare intervals. The breakthrough, which occurred at Bell Telephone Laboratories, is the result of the invention of the transistor. As the vacuum tube and the relay symbolize the past era, the transistor will symbolize the era ahead.

Electronic Exchange

You may have read of our plans to place in trial operation an electronic telephone exchange. It is the transistor that sparked the developments which will make electronic switching practicable. Electronic switching is one of the great challenges to the men and women of the telephone industry. It is a brand-new art, grown on the one hand from the older, electromagnetic relay art, and, on the other, from the new devices invented by the solid-state scientists and engineers.

The systems will be infinitely complex in function, although relatively simple in appearance. They must be endowed with memory, the ability to analyze situations and apply logic, and the ability to act—all with incredible swiftness. In addition, they must record the actions they've taken and check for errors.

New devices, such as those in the electronic switching system, must be designed to work harmoniously with the existing telephone plant. Also, the designers must work as far ahead as they can so their new designs can fit in as well as possible with developments still to come.

While some problems remain to be solved, the first trial of an electronic exchange is scheduled for 1958. The exchange will be installed for service at Morris, Ill., where it will serve about 2,500 customers. Commercial-scale production is scheduled in 1960 or 1961. Eventually, we hope we shall be able to replace many of our existing central offices with this amazingly flexible system.

Among the many advantages we hope to gain from electronic switching, the most important will be to give the customer faster and better service. Where a relay makes its contact in a thousandth of a second, the transistor can block or pass a current a thousand times as fast—in a millionth of a second.

A feature of this new equipment that is of special interest to telephone people is the fact that it will be designed in

(Please turn to page 48)

CARRIER CAN IMPROVE VOICE TRANSMISSION

WHEN one person speaks to another over the telephone, the transmission problem is much the same as that shown in the drawing on this page. The fellow doing the talking is amplifying his voice by shouting through a megaphone, and the old duffer at the receiving end is listening through an ear trumpet which amplifies the received sound.

In between there is a lot of racket from the street which interferes with the conversation. This problem exists to a greater or lesser degree anytime that one person talks to another. In the telephone business, we must have means of overcoming this problem if we want to be able to sell our service.

There are different ways of improving the transmission of telephone conversations. One is to amplify the voice at the sending end, like the man with the megaphone. There is a practical limit to how far we can go with this. If the megaphone transmits too loud, everything the man says will be heard by all the neighbors. On a telephone line, if we amplify too much at the sending end, the same thing will happen. The voice will jump over as crosstalk and be heard on adjacent telephone circuits.

Another way to improve transmission is to amplify at the receiving end, like the old fellow with the ear trumpet. When we do this, we bring up the loudness of the voice all right, but we also amplify the noise as well. Of course, we do not get street noise on a telephone line, but we get other kinds of noise which interfere with the conversation.

Perhaps you may have tried to

tune in a distant station on your radio and could not hear it because of the noise. Raising the volume did not help because this raised the noise too. Tuning in to a stronger station, which has more power at the sending end, would, of course, give you a program.

One other way of getting the message through when the distance is great and the noise is high is by means of a repeater. In the little drawing, this would be the same as having a fellow stand in the middle of the street and repeat everything the man with the megaphone was saying so that the man with the ear trumpet could hear it.

CARRIER TRANSMITTER

To see how this is done on telephone circuits, let us look at a typical carrier installation. A carrier is normally used for the purpose of placing more telephone circuits on an existing pole line without stringing more wire. However, because it is a vacuum tube device and provides amplification, the carrier also improves the transmission and extends the range of a circuit as sort of a bonus in addition to providing extra voice channels on the wire line.

The answer to the difficulties described above rests in providing just the right amount of amplification and power at the sending end so as not to interfere with other conversations. In addition, some amplification can be built in to the receiving end of the circuit. On very long circuits (100 to 200 miles), a repeater can provide amplification in the middle of the line.

A typical four-channel carrier, when connected to a two-wire input voice circuit, will transmit at a level of plus 18 dbm (18 db above zero dbm. Zero dbm is equal to 1 milliwatt of power in 600 ohms). It will do this even though the voice coming in to the carrier is at a level of minus 10 dbm (10 db below zero dbm).

The decibel (db) system as used here refers to ratios of power. The base to which reference is made is one one-thousandth of a watt. This is also called one milliwatt, and the "m" in dbm means that one milliwatt is the unit to which reference is made. Decibels are used in these matters because they are more convenient than the full numbers for which they stand.

But let us look at the above example using the full numbers as well as decibels. The output power of 18 dbm is equivalent to .063 watts. Six-hundredths of a watt is not much power, but remember that the output of an ordinary telephone trans-

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mitter is only about 0 (zero) db, or one-thousandth of a watt. The carrier output of the line is, therefore, 63 times as much as a telephone transmitter.

LOUDNESS

This does not mean 63 times as loud, but 63 times as much power. The human ear, if it could hear the high frequency carrier, would hear it with 18 times the loudness. This is because the ear responds approximately to the decibels of power rather than to the number of times a sound is amplified.

A telephone circuit may come from a considerable distance before it reaches the part of the line which has the carrier on it. (It may come into the office on a wire-line, then become a carrier channel to go the rest of the distance.) Therefore, the power may not be anywhere near as great as the 1 milliwatt put out by a transmitter on a telephone which is right in the office.

Actually, the voice may be as much as 10 db below this value. In plain arithmetic, this means only one-tenth as much power may be coming in on the line as you would get from a nearby telephone. If the transmitter on the telephone is putting out one-thousandth of a watt, only one-tenth of this, one ten-thousandth of a watt, may be reaching the office.

A typical carrier will work with just such a line. It will accept this weak minus 10 dbm voice and amplify it 630 times and send it out on the line at plus 18 dbm. This, of course, is an extreme case, but it shows the capabilities of a carrier system. Such a carrier may be equipped with a continuously variable volume control on the input so that the equipment can be quickly adjusted to voice frequency lines of any level from 10 dbm to plus 25 dbm.

Thus a carrier will take a voice which is only one-tenth as strong as it could be and step it up to a point where it can be sent another 100 or 200 miles, depending on the gauge of the wire.

CARRIER RECEIVER

It was mentioned above that good design called for some amplification at the sending and some more at the receiving end of the telephone line. In addition to the amplification which we have just described for the sending of the carrier, the receiving end is capable of accepting a carrier power which is as weak as minus 15 dbm. In arithmetic —15 dbm is only about 32 millionths of a watt. Yet carriers are made which will respond to this weak power and amplify it back up to one milliwatt, or 0 dbm.

Thus a long telephone line with weak transmission can be brought into the office and plugged through to a circuit equipment with a carrier, sent another 200 miles, and arrive with more loudness than it had to start with.

Putting the above information together, we find that a carrier can send at a power or "level" of plus 18 dbm and receive at the other end at minus 15 dbm. From plus 18 to minus 15 dbm is a total of 33 decibels or an amplification of over 2,100 times. This means that the carrier in this example can be used on any telephone line that does not have a greater loss than this.

GOVERNMENT ISSUES NEW CIRCUIT BOOK

EASY-TO-UNDERSTAND books on the subject of electronics are always welcome additions to a person's library. A recent addition to the literature is a government book issued under the impressive title of "Handbook of Preferred Circuits, Navy Aeronautical Electronic Equipment." It has recently been published by the Government Printing Office and may be obtained for $1.75 from the Superintendent of Documents, Washington 25, D. C. It has 202 pages and many illustrations. The catalog number is D 202.6:C49.

The book consists primarily of a number of different basic electronic circuits. It doesn't show any complete radar or television circuits, but shows many of the small one-and-two-tube component circuits that go into the makeup of complex electronic gear. This book is one that will show a practical working diagram of a squelch circuit or a detector, but will waste few words in telling why the circuit is classed as such.

The volume was prepared by the National Bureau of Standards for the use of people concerned with the design of Navy aeronautical equipment. The idea of the work is to encourage better engineering practices on the part of these designers. It has been found that most electronic circuit functions can be standardized by the use of certain designs. This can result in greater circuit reliability, simpler maintenance, and easier manufacture. It can also result in more efficient use of personnel and in lower costs of equipment.

TRAINING

So much for the military advantages. Besides all of this, the book could easily be used as an excellent training manual for those interested in studying electronic circuits. In addition, it provides a quick reference for specific circuit designs.

In makeup the handbook is in loose-leaf form, and the Government Printing Office promises that additional material is to be made available for inclusion in it.

Part 1 of the manual is made up of 32 approved electronic circuits. These include designs of dc regulators, a detector, limiter, cathode follower, mixer, some amplifiers, multivibrators, oscillators, and others.

With each drawing is a brief discussion concerning the design and use of the circuit. It is made clear that the circuits are not actually standards, nor are they necessarily the most superior design which could be used in each case. They are "preferred" circuits because they have seen wide usage and are well stabilized in design. It might be said that these designs are representative of the state of the art in their respective areas.

CIRCUIT NOTES

Following Part 1 is a smaller section, Part 2, which includes a summary of the steps which led to the adoption of the standard circuit designs. Part 2 is entitled "Notes to the Preferred Circuit Manual." The discussion in this part is tersely presented and gives the background of the differences in similar circuits. It gives examples taken from actual equipment surveys and gives the reasoning behind different design considerations.

The first part is designed for the man who wants the circuit presented concisely, the second is for those who want to know more of the "hows" and "whys" behind the design.

Besides its obvious value to the design engineer, the book can be a big help to the man who is just curious or wants to do some experimenting. While most of the circuits are those concerned with radar operation, each circuit is a basic circuit, and is used in many places. The video designs may be used in television as well as radar. Some of the other circuits will be found in telephone carriers.

An example of the fast pace of the book can be found in "Preferred Circuit 22—Low-Level Cathode Follower." Two pages contain a simple one-tube circuit drawing, complete with all component values, and a brief explanation of it. The example of each of the circuits is simple and to the point. Generally, it is stated in one sentence. In this case, it says: "The purpose of this circuit is to match the output of a low-level video stage to a low-impedance transmission line." Just like that; no double talk, no governmentese.

Three paragraphs then give the operating voltage, the mathematical formula by which it was built and certain other circuit characteristics.

The "Handbook of Preferred Circuits" will not make an electronics technician out of a man with no experience. Neither will it substitute for textbooks which fully explain how electronic circuits are built up from the very start. However, the telephone man who has to wade his way through a microwave or pulsed information circuit may be glad to have a book around which will explain a gating or triggering circuit to him in basic designs of one or two tubes.

SLOW SCAN TV SYSTEM DESCRIBED

A SPECIAL slowed-down type of television which will work over ordinary high grade telephone lines was described at the AIEE summer meeting. A paper presented by G. H. Fathauer and R. H. Smith Jr., of Thompson Products, Inc., described a system which uses a slow scanning rate and a long persistence picture tube. This permits the signal to be transmitted over line facilities of a grade which will handle broadcast or music circuits. Telephone companies are usually prepared to furnish facilities of this type.

Regular television requires a band-width of 4½ million cycles. This permits transmitting a picture composed of 525 lines, 30 times a second. To send this kind of a signal over telephone lines requires special facilities such as polyethylene insulated video pairs. The wide frequency band required would permit sending hundreds of telephone conversations over the same type of facility. Telephone companies which provide video circuits must charge a high rate.

The wide band-width is necessary for regular TV because in order to send a complete picture of moving subjects, over 4 million bits of information must be sent every second in order to reconstruct the picture at the receiving end.

CAN BE SIMPLIFIED

The process can be simplified if a system can be used which requires less information to be sent. Numerous approaches have been made to the problem by different inventors. One approach is the slow scan method. With this system, the scene would be scanned once every five seconds instead of 30 times a second as mentioned above. Also, some of the fine details can be omitted from some pictures. Actually most home TV receivers receive only a part of the fine detail sent out by the station, and nobody seems to mind.

Using these methods makes it possible to send a TV picture over telephone lines which are good enough for music circuits. The effect of motion would be lost with only one picture every five seconds. However, this can be satisfactory for some applications. A long persistence tube is used, which means a "still" picture will remain on the TV screen between the changes every five seconds. Some types of picture tubes known as storage tubes will hold a still picture until it is purposely erased.

TV SNAPSHOTS

If a person was to be identified at a distance, he would only have to stand in front of a TV camera and have a five-second "snapshot" sent to the other end of the line. Motion would not be required in such an application, which could find use in police procedure for example.

A signature could be quickly checked by the same method. One bank could hold a check in front of a TV camera, and compare it with the writing on a master card in another bank.

This type of television can be handled on circuits which will transmit 8 kilocycles. Regular unloaded telephone pairs can handle this frequency with special equalization. The cost of such special line-up is but little more than that required for voice transmission. Certainly, it is no where near as expensive as regular TV channels.

The 8kc requirement is about the same as required by some broadcast stations for music remote channels, and many telephone companies now supply such circuits. Slow scan TV will require the same kind of circuit with the exception that transformers or repeat coils cannot be used in the circuit. On metallic circuits this would usually be of no concern to the telephone company because the

customer provides his own line matching equipment.

A further requirement is that the telephone facility introduce no phase distortion into the signal. Phase distortion at low frequencies can result in a smearing of the picture. Normally telephone lines do not transmit frequencies lower than 60 cycles with true fidelity. Some telephone equipment probably would not respond at all to such low frequency.

NEW DEMANDS

This may have been an advantage in the past where the less 60-cycle response a line had, the less likely it would be to pick up power interference. However, as the electronic art advances, new demands will be placed on telephone companies, so that they will have to be able to handle customer signals without distortion. The authors of the TV slow-scan paper admit that the low-frequency problem has not been solved completely yet.

The slow-scan TV receiver has an 18db (decibel) gain, therefore, can only be used on lines which do not have a greater loss than this. If the range is to be extended, a special repeater will probably have to be developed if standard telephone repeat coils cannot be used.

Already the Bell System has announced the development of a "picture-phone" with which a telephone user can see the person he is talking to. Although details were not contained in the press reports, the system is said to provide a picture every two seconds, and can be transmitted over regular telephone circuits.

NEW ELECTRONICS MAGAZINE STARTS

THE NEWEST entry into the expanding field of electronics publications is *Pacific Electronics Monthly*. Aimed at engineers in research, development, and production of electron devices, the new publication pledges itself to serve these people as a medium for the publication of technical papers and reports.

The first issue contains an interesting and educational article by Estill I. Green of the Bell Telephone Laboratories. It is entitled "The Story of Q," and it relates how this symbol was created by a Western Electric Co. engineer.

In making calculations on electrical circuits, the article says, a need arose for a symbol which would indicate the ratio between reactance and the resistance of a circuit. This is because the resistance present in a circuit consumes and dissipates power, hence may create undesirable waste. Usually, in a radio or telephone coil, the inductive reactance is the important thing, and the natural resistance present may detract from the efficiency of the coil. Historically, a dissipation factor d was first used to indicate the ratio of the resistance to the reactance in a circuit. With this factor, as circuit losses became less, d approached zero.

It was seen that this would result in a number with an increasing number of zeros in front of it, as efficiency increased. The reciprocal of this would be a whole number and much easier to handle, so the factor Q was born to represent the ratio of the reactance to the resistance instead of the other way around.

FIGURE OF MERIT

This factor has since been called a "figure of merit" because the larger the Q of a coil, the more reactance it has compared to its resistance, and is, therefore, more efficient. Coils of very high Q are usually used for critical applications like telephone carrier filters where sharp tuning is necessary.

The principle of the Q factor can be applied to many cases which seem far removed from the original idea of the measurement of a coil. The power industry, for instance, is also concerned with the ratio of reactance and resistance on their lines. The power company sells its power on the basis of the resistive load. That is, the power dissipated by the user is what he pays for. If the customer has some reactance in his load, such as the ballast in cheap fluorescent fixtures, he draws current on one-half of the ac wave, and returns it on the next.

This difference between the true watts used and the apparent watts used results in what is called power factor. It is the cosine of the phase angle between the voltage and current on the line. It is the result of the relation between the resistance and the reactance on the line. This is similar to Q. While power factor is the cosine of the phase angle, Q is tangent of the phase angle.

BOUNCING BALL

Green's article goes on to show that this principle of the relation between power drawn from a source and power dissipated applies to such diverse things as cavity resonators like those found in microwave systems, the structure of permalloy cores, the design of filter inductors, and even is represented in a bouncing ball.

When a ball bounces, the energy which is gained by the ball's falling is returned when the ball bounces. However, it does not bounce as high each time, because some of the energy is lost in resistance or friction. The less resistance the more bounce, and a ball which bounces high could be said to have a high Q factor.

In practice, coils with permalloy cores may have Q's which range from 50 to 250. Ferrite inductors may go to 500 or more; quartz crystals may have Q's from 10,000 to 100,000.

A second feature in *Pacific Electronics Monthly* relates to the theory of games. While it does not present a method for beating the horses, it does show the increasing application of pure mathematics to engineering problems.

This new magazine promises to have a different flavor from others in the field, and is one that telephone engineers will be glad to read. The magazine is a "controlled circulation" publication which means that it is free if you qualify as the right kind of an engineer. Communications regarding the publication should be addressed to P. O. Box 629, Glendale 5, California.

XUM

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

ALTHOUGH VARIOUS utility companies in other parts of the country have successfully used conduit of butyrate plastic pipe, it was a new idea to the Brookville (Ind.) Telephone Co. until recently—but this progressive Independent company was anxious to try the new and easy-to-use material.

For an underground test installation of approximately 280 feet, Mr. R. H. Morin, plant manager, decided to use 2-inch plastic pipe (with a wall thickness of .125 inch), extruded by Yardley Plastics Co. of Columbus, O., from Tenite butyrate supplied by Eastman Chemical Products, Inc., a subsidiary of Eastman Kodak Co.

The entire test installation was completed in exactly three hours. First, a Jeep ditcher dug the 280-foot ditch to a depth of 2 feet in one hour—and at a cost of only $25. Next, a crew of four men assembled the pipe, solvent-welded it and dropped it into the trench. Prior to making the joints, a wire was threaded through the pipe to be used later in pulling-in the 51-pair, 22-gauge lead-covered cable. Finally, the ditch was backfilled by hand.

Explaining his decision to test a conduit of Tenite Butyrate, Mr. Morin stated that he was particularly attracted by its flexibility, its smooth inside wall and the ease and economy of installation.

Butyrate conduit can be incased in concrete or subjected to any normal backfilling operations with little danger of breakage. It also offers high resistance to corrosion and soil electrolysis.

•

Once in a while we hear some old telephone man complain when one refers to a telephone as a phone. To us this is not important and if the contraction is common usage then it should not prove objectionable.

For years, Coca Cola fought the contraction of its trademark name to "Coke." Now they have accepted it and say, "Have a Coke." We might do likewise and say, "Come on and have a few extension phones!"

There seem to be two schools of thought among engineers as to whether cables between units of communication equipment in an installation should be placed on overhead racks or under floor ducts. This is primarily for radio and teletypewriter installations as overhead racks have been used practically exclusively on telephone installations since they were first introduced.

When a building is designed and constructed for a particular installation, underfloor ducts may be provided. Even then there is a danger that future growth may cause them to be blocked at certain points. Overhead racks can be arranged to handle maximum growth and, if they are properly designed, they will present a good appearance.

•

It has been said that it seems to take a lot of exercise to keep Uncle Sam fiscally fit.

Left: Solvent cement is applied to end of pipe and slip-sleeve coupling made of Tenite butyrate. At right, conduit of Tenite easily follows the contour of a ditch—during an underground test installation by Brookville (Ind.) Telephone Co.

Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

We recently received a letter from W. F. Johnson, superintendent of telephone service for United Air Lines, in Denver, Colo., in which he makes the following interesting comments concerning a recent item on this page:

"As a regular reader of TELEPHONY I always enjoy reading 'The Plant Man's Notebook' and the many items concerning your travel experience, particularly those related to air travel.

"Your comments covering in-flight experiences and your observations in connection with equipment or incidents occurring at air terminals have been noted and used to good advantage on many occasions by United Air Lines, Inc.

"I would like to comment on the item which appeared in the Sept. 8, 1956 issue of TELEPHONY outlining your recent flight on National Airlines from Pittsburgh to Washington, D. C., in which you pointed out the similarity of the 'sharp climb from 12,000 to 18,000 feet to that made by the United Air Lines plane when it ran into a TWA plane at Grand Canyon. . . .'

"I believe your readers should know that the United Air Lines plane was cleared by Air Route Traffic Control to fly at 21,000 feet. The TWA plane was cleared by the same agency to fly at 19,000 feet but subsequently, at the request of the TWA pilot, was cleared to fly at '1,000 feet on top'.

"From aircraft position reports received prior to the collision, it is known that both aircraft were flying at 21,000 feet.

"It should also be definitely pointed out that blame for this accident has not been placed. At this time, no one knows definitely who may have been at fault.

"A second point in the same item should also be clarified, namely, your reference to the fact that '. . . National has all its planes equipped with radar so that they can detect any nearby object.'

"This would imply that the radar might be used as a proximity warning indicator to detect the presence of nearby aircraft. Radar presently in use by the airlines was installed for the purpose of weather mapping, to enable pilots to detect the presence of storm areas and safely and comfortably fly through or around them.

"Although this radar will provide definition of nearby objects, it does not provide the spherical coverage required for true 'proximity warning'. As a matter of fact, it is limited to 250-degree coverage and a band width of only 5 to 7 degrees.

"Incidentally, considerable time and effort is currently being devoted to the development of adequate proximity warning equipment.

"You may also be interested to know that United Air Lines was the first in the industry to commit for total fleet weather mapping radar. The installation is about two-thirds complete at this time, scheduled for completion about June 1957."

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It has been said that discussion is an exchange of knowledge; argument is only an exchange of ignorance.

Q. What in your opinion is the type of wire considered best for use in lashing aerial cable?

A. Any of the approved types of lashing wire will prove entirely satisfactory for this purpose.

Galvanized steel in sizes .045 and .091 is used extensively. Aluminum wire .091 is sometimes used where corrosive conditions are severe. Stainless steel in sizes .045, .061 and .091 is also used to combat corrosive conditions.

Copper and Copperweld lashing wire is available, but it should be used only where the strand is of the same material.

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Q. We contemplate the purchase of a dial speed tester for use on our dial telephone system and are not quite certain what type will best meet our requirements. We shall appreciate any suggestions you might give us concerning a suitable type.

A. In our opinion, all types of dial testers now on the market will give good service providing they are used properly.

Personally, we prefer controls so that a troubleman merely dials a certain number to be connected to the dial speed tester. He then dials "O" and one, two or three "splashes" of tone indicates whether the dial is slow, of correct speed or fast. This type of tester is a proved time saver.

•

Q. How does the shield resistance of plastic-insulated and jacketed cable compare with lead-covered cable of similar size?

A. The sheath resistance of lead-covered cable is in the order of .6 ohm per 1000 feet of cable for a cable having a diameter of one inch under the sheath. The REA's tentative specifications for plastic cable specify that "an electrostatic shield of copper or aluminum foil should be applied over the core, the shield to have a dc resistance of not more than 2.5 ohms per 1000 feet of cable for a cable having a diameter of one inch under the sheath."

Q. We are frequently required to run several miles of line to service contractors operating temporarily in our area. These are temporary installations and in many cases we do not have facilities available and open wire lines are already overloaded. We hesitate to run rural distribution cables of several pairs when only one circuit is required temporarily. What would you suggest as the most economical method of providing this type of service on a temporary basis?

A. Perhaps your best bet is to make use of the new "C" type parallel distribution wire.

This wire is available in #14 AWG and .080-inch, extra-high strength, 30 per cent conductivity Copperweld conductors. It is easy to install, will give good service, and in your case, may be recovered and reused.

•

Q. What items of supplies and instruments should be contained in a first-aid kit of a type carried on a line construction truck?

A. Although opinions may differ on this subject among safety people, any good, approved-type kit will probably contain all of the items required to effect normal first-aid treatment. The kit of one manufacturer contains the following items:

Adhesive bandages, 1-inch.
Knuckle-band.
Bandage, adhesive plastic patch, 8½ inches x 1½ inches.
Tourniquet, forceps, scissors, eye dropper.
Adhesive tape, 1 inch x 2½ yards.
Gauze pads, 3 inches x 3 inches.
Aromatic ammonia.
Ammonia inhalants.
Gauze bandage in rolls, 2 inches x 10 yards.
Gauze bandage in rolls, 1 inch x 10 yards.
Boric acid ointment.
Cotton wound applicators.
Aspirin, 5-grain.
Hexachlorophene soap.
Methiolate.
Rubbing alcohol.
Boric acid solution.
Absorbent cotton.

We agree with Dave—

using clean PENTA-treated crossarms makes sense

We were putting up our first batch of PENTA*-treated crossarms the other day when Dave dropped by. Dave's our purchasing man, and a man who knows his business. And I figured it would be a good time to find out why he switched us to treated crossarms, so I asked him "how come?"

Dave explained that we wanted the crossarms to last as long as the poles, and the best way to get that sort of service life would be to put PENTA-treated crossarms on PENTA-treated poles. That would mean a cut in replacement costs. Also, insulator pins stay put longer because PENTA prevents rot damage to the wood around the pins. And the bolts hold better, too, for the same reason.

I agreed that treated crossarms sound like good common sense . . . and from the crew's standpoint, I was glad the preservative was PENTA, because it's so clean and easy to handle, even in hot weather.

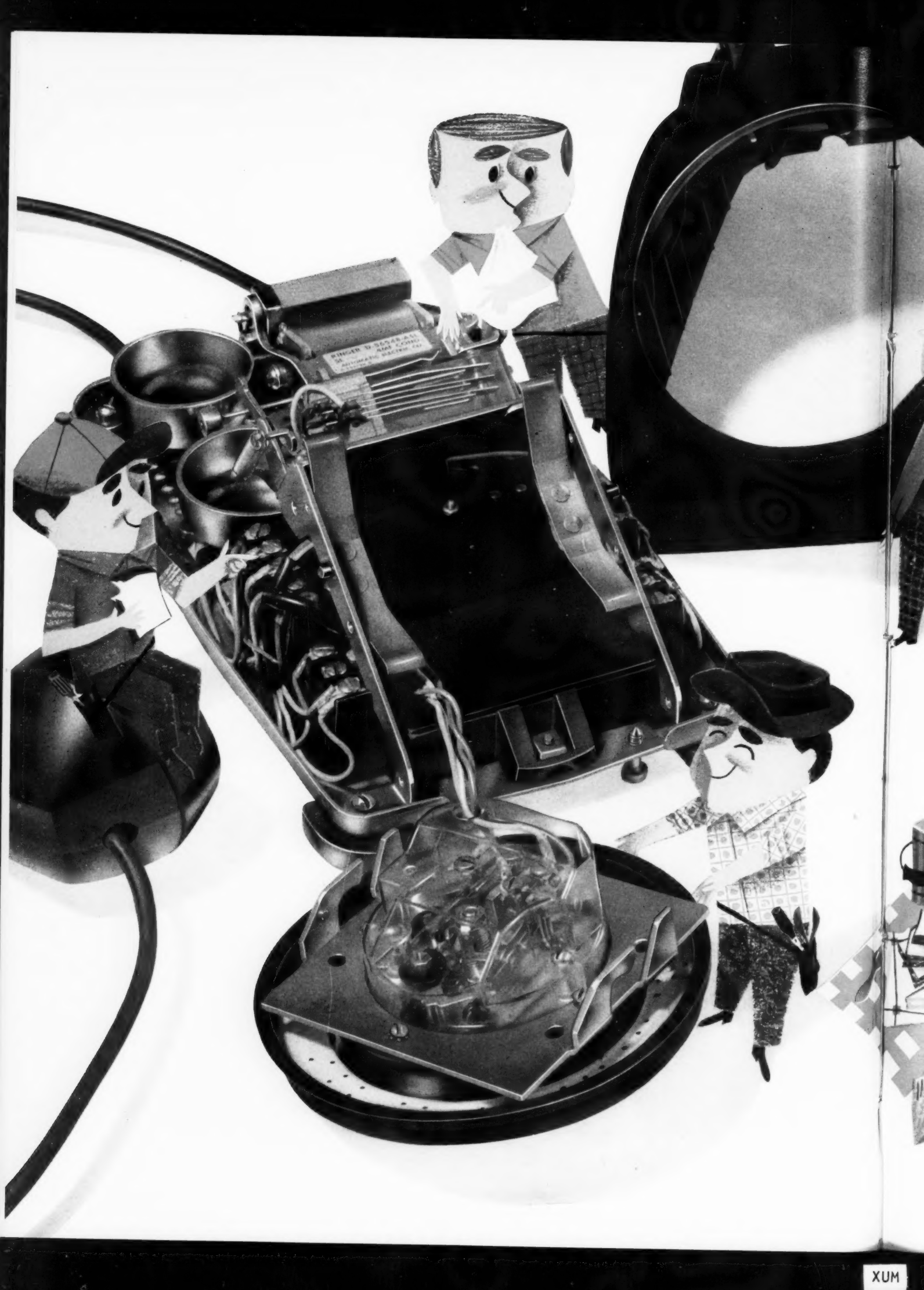
When Dave told me PENTA-treated crossarms don't cost a penny more than other treated crossarms, I had the whole story. Easy to see why we're going to specify PENTA on all orders for poles and crossarms from now on. Matter of fact, sounds like a good idea for other utility companies, too. THE DOW CHEMICAL COMPANY, Midland, Michigan, Department PE 983C-1.

* Pentachlorophenol

you can depend on DOW CHEMICALS

DOW

XUM



XUM

it's a **picnic** to work on!

Installation and servicing are easy...if you're working on Automatic's Type 80 Monophone!

The housing is an easy-to-remove shell with no wiring or components fixed to it. After you take it off, you hold the hook down by merely flipping a lever—no calls are lost, no switches tied up. Handy bayonet prongs hold the dial in place (and one twist frees it!) When it's removed, every part, every solderless terminal is *right in sight, easy to get at.* Your installer makes all adjustments—even ringer changes—without fuss or fumbling; he's done quickly and away he goes. You make substantial man-hour savings!

Maintenance men like Type 80 because it's so easy to get to—and because of its *freedom from trouble.* Subscribers like its clean modern lines, pleasant ring, and true-to-life transmission. Why not please everybody?—send your order in, today! Address:
Automatic Electric Sales Corporation,
1033 W. Van Buren St., Chicago 7.
Or call HAymarket 1-4300.

AUTOMATIC ELECTRIC

ORIGINATORS OF THE DIAL TELEPHONE

GENERAL SYSTEM

INDEPENDENT

XUM

Section 23 (Continued)
Assignment of Extension Lines to Connector Groups

Having obtained the necessary basic data, the next step is to determine which lines are to be assigned to each connector group. Since the PBX switches are engineered on the basis of average calling rates and holding times and a certain number of lines per group, it is important that the assignments be made so that each group carries its proportionate share of the traffic.

Distributing the lines of each department over the connector groups will usually accomplish a satisfactory traffic balance. Where there is a pronounced variation in calling rates and holding times, the high and low usage lines should be distributed between pairs of connector groups in order that the necessary balance will be obtained on the associated line finder groups.

This method of assignment for an installation having four connector groups of equal size and two line finder groups of equal size is illustrated below:

SAMPLE FORM B
Connector Assignment Record

Hundred No. _____ Customer _____ Address _____ Tel. No. _____

Item No.	Name of Extension User	Dept.	Room or Floor No.	Conn. Term.	Line Finder Grp.	Line Finder Term.	Bridged	Grp. Hunt.	Man.	Best.	Usage High	Usage Low	Misc.
				0									
				1									
				2									
				3									
				4									
				5									
				6									
				7									
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Item No.	Name of Extension User	Dept.	Room or Floor No.	Conn. Term.	Line Finder Grp.	Line Finder Term.	Bridged	Grp. Hunt.	Man.	Best.	Usage High	Usage Low	Misc.
				50									
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	Equipped	Working	Available
Dial Lines			
Manual Lines			

Department	Total No. of Ext. Lines	No. of Ext. per Connector Group 1	2	3	4
Executive	26	6	7	7	6
Engineering	41	9	10	11	11
Accounting	44	8	12	12	12
Manufacturing	96	21	25	25	25
Stock*	20	12	3	3	2
Sales	35	5	10	10	10
Shipping	33	4	10	9	10
Total	295	65	77	77	76

*In this example, nine of the extensions are arranged for trunk hunting and are heavy calling rate extensions. Since only one trunk hunting connector group is provided, these lines are assigned to the same group and allowance for the high calling rate is made by assigning a smaller number of total lines to this group than to the others.

Connector Assignment Record

When the number of extension lines associated with each department has been determined for each connector group, the actual assignment of these lines to their terminal takes place. Sample Form B is suggested as a guide for this purpose. One form takes care of a complete connector group. Each form has capacity for 100 connector terminals and associated line finder terminals, thus picturing the status of each terminal. Certain items which are shown on Form A (TELEPHONY, Oct. 6) are included on Form B as an aid to balancing the traffic on different groups. The same codes and procedures suggested for Form A can be used on Form B.

Terminals which are not available for assignment, because the associated line finder terminals are not equipped, should be crossed out.

(Section 23 to be continued next week)

Courts and Commissions

Wyoming Commission Rules On City Tax Issue

Wyoming's Public Service Commission on Oct. 5 held in a precedent-setting decision that a public utility can pass on to its consumers in a city any excise tax levied by the municipality.

The commission further ruled, however, that the city's charges against a utility under a negotiated franchise agreement can be charged to its operating expenses and thus passed on to all its consumers in the city and outside of it.

The commission decision was issued on Montana-Dakota Utilities Co.'s request to increase rates in the communities in its Sheridan division because of a $30,000 annual occupation tax on its operations in the city and a 1 per cent gross receipts tax charged for its Sheridan franchise.

It was held that the $30,000 tax could be passed on to its consumers within the city of Sheridan, provided that the pro rata amount charged each consumer is listed separately on the bill. The company also could charge 2 per cent of the pass-on charge to cover the additional billing expense.

The commission also held, however, that the franchise agreement is a voluntary contract which the company can charge off as an operating expense that can be applied to its operations in the division—which includes Sheridan, Buffalo, Kaycee, Ranchester, Dayton, Big Horn and Story.

The commission also ruled that the 1 per cent gross receipts tax written into the franchise contract is a "reasonable amount" and that any charge above that figure would have to be considered an occupation tax which could be passed on to consumers within the city.

Its decision was important, the commission said, because there was no precedent in law or commission action for determining what charges can be passed on to consumers. The differentiation between excise taxes and the franchise contract has been upheld by a court decision in the state of Washington.

The Wyoming commission said there is a "basic and fundamental" difference between an occupational or business tax levied to raise revenue and the charge for the franchise because of the voluntary nature of the latter.

It was observed that the problem faced in the decision is one which has become of increasing importance in Wyoming because of the increased inclination of cities to levy new taxes on utilities as a means of raising revenue without hiking residents' taxes.

Minnesota Company Awarded Increase in Rates

Pioneer Telephone Co. of Todd County on Oct. 8 secured authority from the Minnesota Railroad & Warehouse Commission to increase rates at its Browerville and Long Prairie exchanges.

The rate raise effective upon completion of proposed additions and after proposed wage increases, will boost net operating revenues from $59,316 to $64,810, although net operating income will drop from $9,711 to $8,268—a 5.88 per cent return on a plant fair value of $140,658.

Old and new rates* are:

	Old	*New*
Long Prairie:		
One-party business	$5.00	$5.75
Two-party business	4.25	5.00
One-party residence	3.25	3.75
Two-party residence	3.00	3.35
Four-party residence	2.50	2.75
Rural residence	3.00	3.50
Browerville:		
One-party business	4.50	5.25
Two-party business	4.00	4.75
One-party residence	3.00	3.50
Two-party residence	2.75	3.00

*A discount of 25 cents to be allowed on all gross rates if total bill is paid on or before 15 days from date of bill.

The Pioneer Company served 1,023 company-owned stations and 734 switched stations as of March 31, 1956.

Oklahoma Company Requests Increase in Rate Schedule

The McCurtain Telephone Co. on Sept. 28 asked the Oklahoma Corporation Commission for permission to raise rates for the towns of McCurtain and Panama.

The company asked to increase its revenues from $4,357 to $5,929 in McCurtain and from $10,265 to $12,505 in Panama.

Proposed new rates in both towns would be $5.50 for one-party business service and $4.50 for one-party residence service.

Neb. Commission Authorizes Stock Issue, Rate Raise

The Nebraska Railway Commission on Sept. 18 authorized the Kenesaw Telephone Co. to issue common and preferred stock, eliminate company-owned toll and extended area service, and establish rates for automatic service. A certificate of convenience and necessity was issued.

The Kenesaw company has 325 subscribers and is engaged in converting its exchange to automatic operation. The order authorizes the sale of up to 200 shares of common stock at $50 per share and 200 shares of Series A, 1956, preferred stock at $50 per share. This capital will be used to finance the automatic conversion. The following rates were established effective with the date of conversions:

One-party business	$7.50
Two-party business	6.75
One-party residence	4.75
Two-party residence	4.25
Four-party residence	3.75
Rural	3.75

Under these rates, annual revenue is estimated at $18,497 and expenses at $12,220, exclusive of $1,266.78 in federal income tax. This will produce a net income of $5,010.22, which is equal to a 6.5 per cent return on an adjusted rate base, after conversion, of $76,858.18.

The commission also approved a certificate of convenience and necessity which would permit the company to extend its service to certain adjoining areas, but only in case subscribers in these areas decide to discontinue their present service.

Extended area service to Heartwell, Norman, Holstein, Roseland, Juanita, and Prosser will be discontinued and all company-owned toll facilities will be eliminated.

Neb. Commission Authorizes Rates for Five Companies

The Cuming County Independent Telephone Co., Wisner, was authorized by the Nebraska Railway Commission on Sept. 28 to apply the following rates for new services:

Loud speaking telephone sets at a rate in addition to normal charges for main service, extension telephones or PBX service of $2.50, and a non-recurring charge of $5.00 for installation and moves.

Colored telephones at a rate of 25 cents in addition to the regular rates for black sets.

Electronic secretary equipment at $15 and a non-recurring charge of $5.00 for installation and moving.

*

The Campbell Telephone Co. was authorized on Sept. 28 to increase the rate for one-party residence service from $3.00 to $3.15. Formerly the differential between residence one-party and two-party service was 10 cents. The new rate will provide a differential of 25 cents.

*

The Northwestern Bell Telephone Co. on Sept. 28 was authorized to introduce new rates for different types of public emergency reporting service.

Two capacities of the emergency system are provided. The smaller system provides a maximum of six one-party and simultaneous connection. The larger system provides connections for a maximum of 63 volunteers.

*

The Northeast Nebraska Telephone Co., Hubbard, was given permission on Sept. 28 to establish a rate of 10 cents per call for local service from public and semi-public telephones.

*

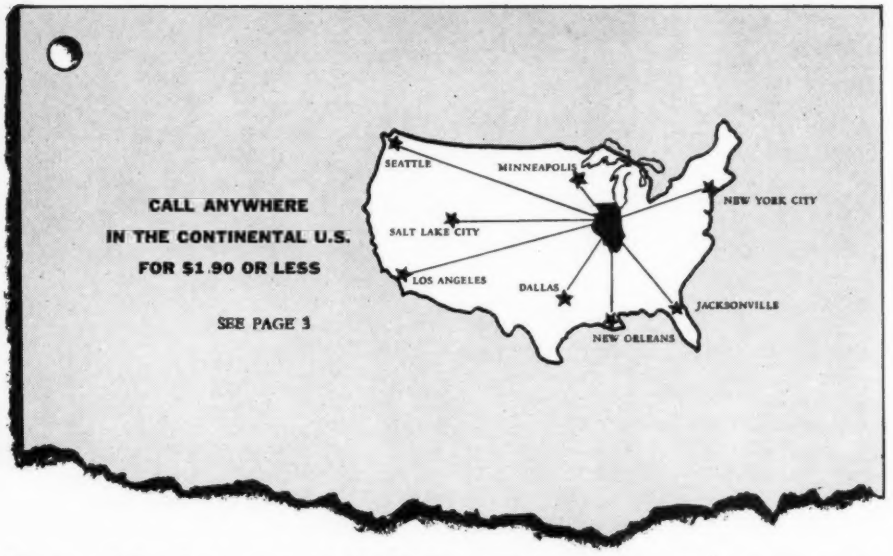
The commission on Oct. 9 authorized the Chapman Telephone Association to increase rates.

Illinois Independent Given Permission to Borrow

The Illinois Commerce Commission has authorized the Chandlerville Telephone Co. to borrow $57,000 to purchase and install new automatic switchboard equipment, it was reported on Sept. 21 (TELEPHONY, Sept. 22, p. 34).

The company petitioned the commission for permission to borrow the money for a modernization and expansion program.

The loan will be made by Stromberg-Carlson, a division of General Dynamics Corp., Rochester, N. Y. It will be secured by a mortgage on the company's property.



Section of the front cover of the El Paso (Ill.) Telephone Co. directory which brings home to telephone users the reasonableness of station-to-station rates for evenings and Sundays—less than $2.00 to anywhere in the continental U. S. Rates to 70 cities appear on page 3 of the directory.

Missouri Independent Asks Rates for Dial Service

The Purdy Telephone Co. recently filed a request with the Missouri Public Service Commission for a new schedule of rates that would go into effect upon conversion to automatic operation.

Norman Gibbons, company manager, said cut-over to dial service is scheduled for Nov. 1.

Present and proposed rates are:

	Present	*Proposed*
One-party business	$3.50	$6.50
Two-party business	—	5.75
Four-party business	—	5.25
One-party residence	2.75	4.25
Four-party residence	2.25	3.25
Rural business	2.75	5.50
Rural residence	2.25	3.25

The Purdy company is awaiting approval by the commission of plans for the purchase of the Wheaton Telephone Co. and its conversion to automatic (TELEPHONY, May 19, p. 45). The Rural Electrification Administration has already approved a $178,000 loan for the purpose.

Texas T&T Gains Raises At Three Exchanges

On Sept. 24, the city of Morgan approved rates for automatic service, reports the Texas Telephone & Telegraph Co., Corsicana. The Morgan exchange has 72 stations. The rates are as follows:

	Old	*New*
One-party business	$6.00	$8.00
Two-party business	—	7.00
Four-party business	—	6.50
One-party residence	4.00	5.00
Two-party residence	3.00	4.60
Four-party residence	—	4.25
Multi-party residence	3.00	—

On Oct. 1, the city of Ferris approved rates for automatic and also interim rates. The Ferris exchange has 639 stations. Rates are as follows:

	Old	*Interim*	*New*
One-party business	$3.75	$5.00	$8.70
Two-party business	3.25	4.50	7.80
Four-party business	—	—	7.20
One-party residence	2.50	3.50	5.40
Two-party residence	2.25	3.00	4.50
Four-party residence	—	—	4.00

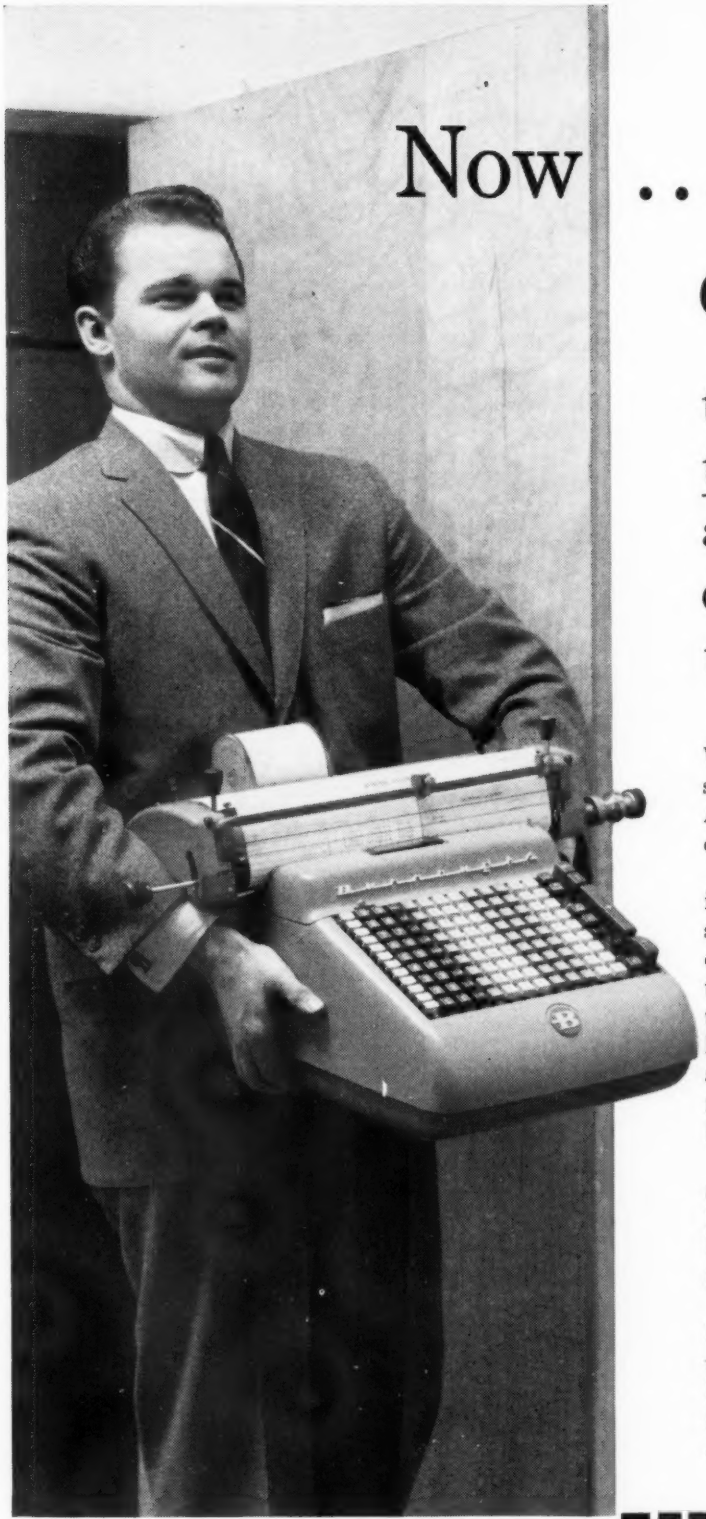
On Oct. 3, the city of Walnut Springs approved rates for automatic service. The Walnut Springs exchange has 117 stations. Rates are as follows:

	Old	*New*
One-party business	$6.50	$8.00
Two-party business	—	7.00
Four-party business	—	6.50
Multi-party business	5.00	—
One-party residence	4.00	5.00
Two-party residence	3.25	4.60
Four-party residence	—	4.25
Multi-party residence	3.00	—

Since Jan. 1, the company has received approval of automatic rates for 20 exchanges. Eight of these also approved interim rates.

Mo. Company Asks Raise

The Missouri Public Service Commission received on Oct. 9 the application of the Fidelity Telephone Co. for authority to file a revised schedule of rates.



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Gentlemen: Please send me, without obligation, your booklet, "Low-Cost Revenue Accounting for Independent Telephone Companies."

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T-74

DEPARTMENT OF TECHNOLOGY BUFFALO AND ERIE COUNTY PUBLIC LIBRARY

Independent Company Adopts Highway Advertising Program

GARDEN Valley Telephone Co., Erskine, Minn., recently completed conversion of all 21 of its exchanges to automatic operation under REA financing. The company is now directing its attention to detailed plans for continued effective operation, and one of the subjects for consideration is the matter of advertising, says Carl M. Ostby, general manager — one avenue being outdoor signs.

Mr. Ostby reports that to attract people to paystations, the company experimented with 18-by-24-inch Scotchlite signs saying, "Telephone—¼ mile." However, it was found that, with the numerous advertising signs of all kinds along highways in the company's territory, their own became, as Mr. Ostby says, "camouflaged out of the picture" and "lost in the maze."

Then it was decided that instead of putting numerous small signs in all exchanges, the company would compete for the attention of passers-by by using large Scotchlite signs, 5 feet by 11 feet. Since the cost to put one of this size in every one of the towns served, would be prohibitively high, the decision was made to place but four signs, each strategically located on either the north-south or east-west main highway "point of entry" into the service area. Mr. Ostby states:

"In this way everyone entering the Garden Valley Telephone Co.'s service area will meet one of these signs and we have made it a point to place our red, lighted plastic-domed booths in conspicuous places in each town along the main highways as they pass through our area.

"The signs are quite attractive. The booth in the sign is in red as are our actual booths. The background of the rest of the sign is in blue and white; and the whole thing is quite eye-catching, particularly at night. This Scotch Lite, red booth looks especially realistic when the light strikes it."

The company feels that these signs will awaken passing motorists to the fact that they perhaps should make a telephone call and to the fact that they will find telephone service ahead. The signs are big enough and attractive enough to compete for the attention of motorists and the fact that only four are needed to catch everybody going in reduces total costs, Mr. Ostby states. He concludes:

"We feel that the signs, besides attracting strangers or other motorists passing through, also serve as a public relations medium as concerns our own subscribers. These people, when they have been away from home and drive back into their own Garden Valley Telephone Co. area and see this sign, will feel that their company is progressing and no longer living in the horse-and-buggy era and is rendering service in a modern way.

"These signs of ours are rented from a sign company on a monthly rental basis where the sign company erects the sign, gets the easement or permission for the placement of it and keeps it in complete repair."

One of the eye-catching signs Garden Valley Telephone Co., Erskine, Minn., has placed at the "points of entry" into its service area.

General of the SW Gains Two Rate Raises in Texas

The following Texas rate increases were granted General Telephone Co. of the Southwest, San Angelo:

Abernathy, common battery, 629 stations, effective Sept. 1.

	Old	*New*
One-party business	$6.50	$9.50
Two-party business	5.00	8.00
One-party residence	3.50	4.75
Two-party residence	3.00	4.00
Four-party residence	—	3.50

Anton, automatic 368 stations (Oct. 1).

One-party business	8.50	9.75
Two-party business	6.50	7.75
One-party residence	4.50	5.00
Two-party residence	3.75	4.50
Four-party residence	—	4.00

Citizens Utilities Co. Buys California Independent

Citizens Utilities Co., Stamford, Conn., on Oct. 8 announced that its subsidiary, Citizens Utilities Co. of California, was authorized by the California Public Utilities Commission to acquire the business and property of the Shasta Telephone Co., Millville.

This is the sixth 1956 acquisition announced by the company.

Obituaries

RALPH A. BAILEY, 56, president of both the Leeds (Ala.) Telephone Co. and the Alabama-Mississippi Independent Telephone Association, died on Oct. 8 after an illness of several months.

Surviving are his widow, Lou S.; one daughter, Barbara Lynn Bailey; three brothers, Warner and J. C., both of Houston, Tex.; and T. H., of Macon, Ga.; two sisters, Mrs. Margaret Moran and Miss Elizabeth Bailey, both of Houston.

*

ODIS IRA DOMINEY, 54, owner and operator of the Dudley (Ga.) Telephone Co., died at his home on Oct. 7, about one hour after he had become ill.

Survivors include his widow, the former Miss Lucy Rozar; one son, Durwood Dominey, Dudley, now attending Mercer University in Macon; a brother, Willie T. Dominey, Macon; three sisters, Mrs. Hattie Barron and Mrs. F. J. Firges, both of Macon, and Mrs. Rosa Hatcher, of Irwinton; and several nieces and nephews.

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United States Independent Telephone Association
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This 30th USITA national ad appeared in Oct. 15 Time and Oct. 19 U. S. News and World Report

Fifteen Workable Ideas For Office Improvement

By William J. Milford

IN OUR CONSTANT search for methods of improving efficiency in our offices, we peer into many nooks and crannies. One of those most frequently overlooked by the average telephone company office manager is the improvement of working conditions in his department.

No employe can deliver his or her peak efficiency under conditions which are either adverse or lacking top efficiency. In almost every instance, no piece of office equipment is any better than the employe operating that unit.

For this reason any step we can take to improve working conditions in the office is a step in the right direction. Here are 15 suggestions for such improvements. All are inexpensive. Each can be adapted to both the small office and the large layout.

(1) Improvements in lighting can be made in almost every office. In some instances this calls for nothing more than re-arrangement of the office layout. In others the use of better lighting fixtures can do the job.

The office should be so arranged that as many workers as possible obtain a natural light intensity of at least 30 foot-candles on average clear days.

The same standard should apply in the use of artificial lighting in the office and particularly over and around those areas where the most detailed work is being done.

(2) Sometimes rearrangements of working desks can increase the efficiency of the men and women who do their chores thereon. One good test is to make certain that desks face so that the light falls on the working surface from the left rather than from the right wherever it is possible to provide such an arrangement.

Rearrangement of high pieces of furniture (such as tall filing cabinets, for example) which cast shadows from either natural or artificial light can also eliminate some inefficient working conditions.

(3) Another rearrangement we can make with respect to natural lighting conditions is to arrange desks and tables where high concentration is required in work so that direct sunlight does not fall on them.

Such glare can be very destructive to employes' nerves and can reduce their visual efficiency as well as their thinking efficiency. Window shades, venetian blinds or other shading means should be provided for such windows (particularly on south, east and west exposures). Also, these should be checked regularly to make certain that they are in proper working order.

(4) Still another improvement which can be made in lighting is to check for possible glare from reflected sunlight—most damaging when it strikes an employe's working surface or area. Most overlooked sources of such glare are in the office itself; i.e., direct sunlight hitting highly polished desks, filing cabinets, storage units and even modern office machines and equipment. Proper shading of the source or even reflectors to steer glare away from such objects are worth installing where these reflectors cannot be moved.

(5) A periodic examination of lighting fixtures used in the office is also good procedure. Not only can we get glare from these under some circumstances but a number of old types have a bad habit of reflecting light shadows. Heavy shadows are usually apparent but these lighter shadows can be just as damaging when they prevail for a number of hours during the day.

(6) Colors used in painting the office walls and ceiling can often be changed to provide better working conditions. If a color lacking in proper light-reflecting qualities is not being used at present, the cost of a change-over will be more than repaid through increased efficiency of the staff.

(7) An often-overlooked asset is the keeping of walls and ceiling as clean as possible. Maximum cleanliness preserves light-reflecting qualities of any office wall or ceiling.

(8) Floor coverings may also offer an opportunity for such improvement of working conditions. The floor covering should be one that has high qualities of resilience, evenness of surface, sanitation, durability, sound absorption, ease of repair and ease of cleaning. All of these factors contribute to cost but they also contribute to added efficiency in any office. They are therefore a good investment in even the smallest office.

(9) Noise is another factor which may need attention. Whenever possible to do so, it will pay to make certain that noise from disturbing, noise-producing operations of the business is prevented or deadened at the source. Sound deadening ceilings and wall covering can be used under extreme circumstances.

Attention should also be given to possibilities of reducing noisy machine operations in the office, even to the extent of partitioning off such sections from the general office.

(10) Special attention can well be given to providing more partitions or private offices for employes whose work requires concentration or involves confidential conversations. Such a need is particularly high today as every business operation becomes more complicated and more skilled personnel are required — people who need freedom from distractions to do their specialized work efficiently.

(11) Comfortable working conditions are always to be considered in any study of this nature. Sufficient ventilation without drafts is a must requirement. Where no artificial ventilation system is provided, an ample number of electric fans should be present. Under adverse local conditions, a method of air cleaning can often increase the efficiency of office personnel.

(12) Control of atmospheric conditions in the office always leads to increased efficiency of the staff.

Today the equipment is available with which to accomplish this goal and most of it is within the budget of even the smallest office. Such equipment should provide a relative humidity of between 30 and 60 per cent.

Walls, ceilings, roof, floors, etc., can be insulated to reduce heat outgo in winter and heat intake in summer. The heating system used in winter should provide and hold a temperature of about 68 degrees F. for an ideal working condition.

(13) Are clocks and similiar accessories important in the office? They are for many business firms today. Seeing to it that an extra clock or two will provide a view of the time for every employe in the office, without his or her being required to get up from the desk, can in such instances increase and add to the work output of such employes.

(14) Provision of proper facilities for the comfort and convenience of members of the staff may also assure a boost in morale and with it a corresponding increase in efficiency.

(15) In less modern offices work

efficiency can often be increased by the installation of a duct system in the floors so that electric service can be supplied to any desk without exposed wires or conduits on top of the floor.

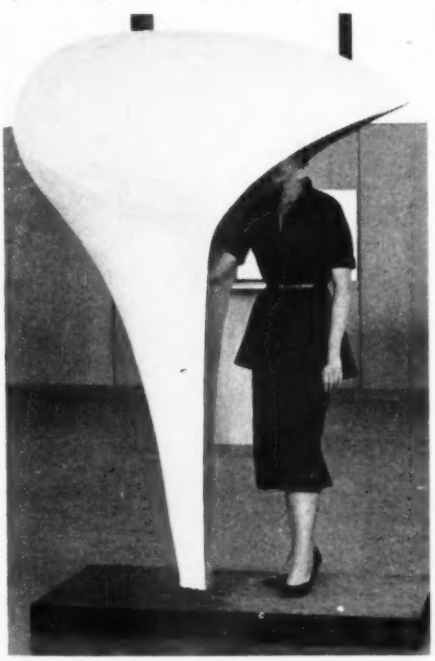
Wherever a collection of extension cords exists in such an office this installation should be made immediately. Not only can it provide electricity to every desk for use on modern office machines, but it can eliminate certain accident possibilities.

Student Designs Booth For "Picture Phone"

Most people think the day when they can step up to a telephone and see the person they are talking to as well as hear him is far off in the future.

Not Petras Aleksa, a student at the Institute of Design of Illinois Institute of Technology of Chicago.

Aleksa is so optimistic that television principles applied to the telephone soon will be an accepted means of communication that he has designed a telephone booth for the so-called "picture-phone." (See cut.)

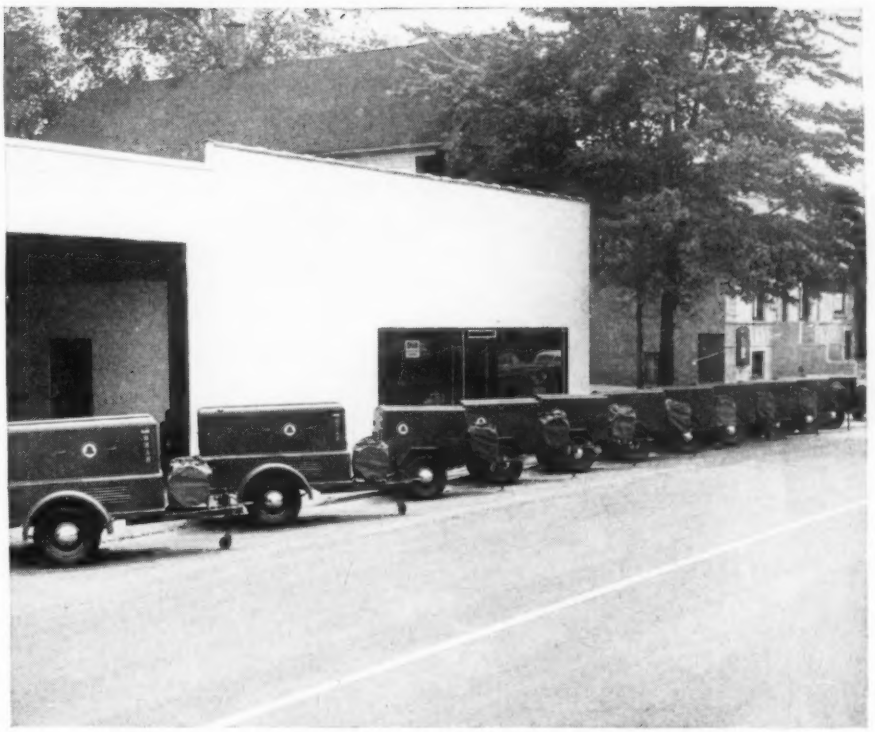


A senior, majoring in product design at the Institute of Design, Aleksa designed the futuristic booth for an open house exhibit at the Illinois Institute of Technology.

According to Aleksa, the graceful free-form structure is designed especially for use in parks and natural wooded areas.

"However," he said, "we might want to try it on a city street. Its curving shape might prove an interesting contrast to the rows of angular buildings that fill our cities."

(Please turn to page 48)



Power insurance . . . on wheels, for the Michigan Bell System

This fleet of eleven trailer-mounted Onan Electric Plants was recently put into service by the Michigan Bell Telephone Company. Self-contained and highly mobile, these gasoline-powered generating units can be rushed to any exchange where an outage of commercial power occurs.

The new fleet consists of six 5KW, three 10KW and two 25KW Onan plants. All are remote starting units generating 115/230-volt, 60-cycle, single-phase current. Each is mounted on a high-speed, 2-wheel trailer with a weatherproof housing that encloses the built-in fuel tank, starting battery, engine-instrument and electric meter panels, and A.C. outlet receptacles. The drawbar supports an extension cord reel.

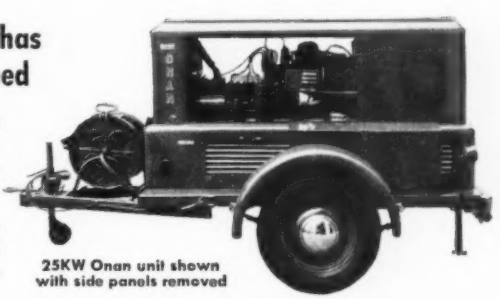
Within minutes after the electric plant arrives at the exchange, it is supplying power to keep telephone service operating.

The Michigan Bell System is one of many companies using Onan Emergency Electric Plants to help assure vital telephone communications at all times, under all conditions.

Trailer-mounted, or permanently installed, Onan has a standby plant for every need

Standby models are available from 1,000 to 75,000 watts. Air-cooled models up to 10,000 watts available with Vacu-Flo air-cooling for installation in areas where ventilation is a problem.

Onan also builds lightweight, portable plants for plug-in electricity on maintenance and construction jobs. 500 to 10,000 watts.



25KW Onan unit shown with side panels removed

See how other companies are using Onan Standby and Portable plants. **WRITE FOR FOLDER.**

Onan ELECTRIC PLANTS

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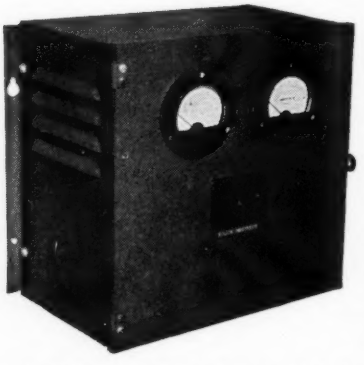
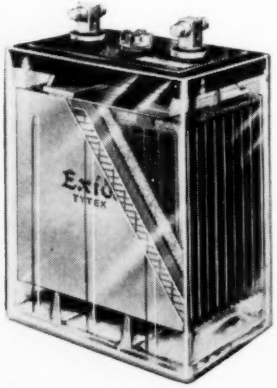
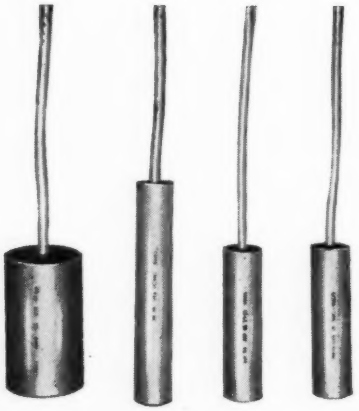


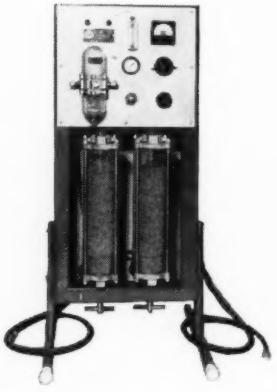
First Choice of the Telephone Industry! The Raytheon RectiChargeR is fully automatic, maintains constant output voltage regardless of variation of load and line voltage. Never overcharged or undercharged, batteries last longer. RAYTHEON MFG. COMPANY.



More Power, Less Space—the Exide-Tytex battery requires only one half to two thirds of the space needed by the conventional cell. Permits smaller racks in new installations. Exide Industrial Division. THE ELECTRIC STORAGE BATTERY COMPANY.



Application of Loading Coils on telephone circuits reduces unit loss to ⅓ or ¼ the non-loaded value—coils shown are used on a 2-wire telephone circuit in non-quadded paper insulated or plastic cable. COMMUNICATION EQUIPMENT & ENGINEERING CO.



Air Compressor Dehydrator for supplying dry air to aerial and underground cables. Supplies up to 40 cables. Individual air flow indicators for each cable. Both Automatic and Manual Units are available. S & G MFG. CORP.

KELLOGG BRANCH WAREHOUSES AND OFFICES:

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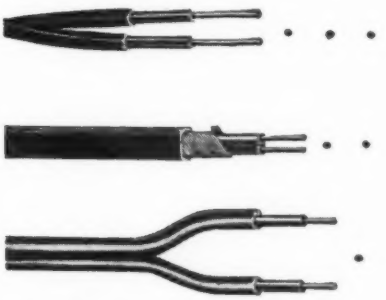
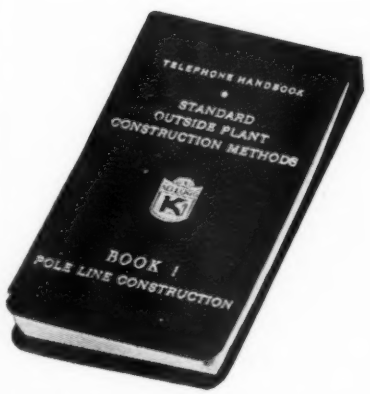
Vibration Dampers used on wire adjacent to insulators on pole to prevent fracture from fatigue caused by wind vibration. Made of flexible Polyethylene, and helically slit with approximately three turns to the foot. DETROIT MACOID CORPORATION.

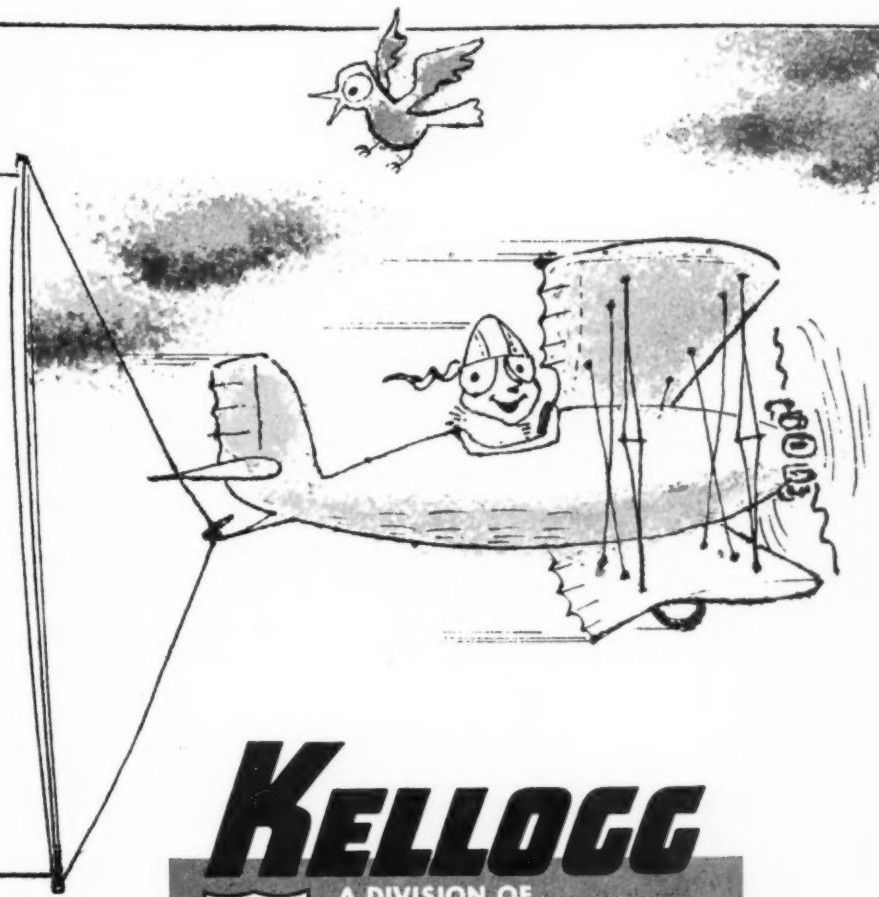
5-Circuit Power Cross Protector provides a single assembly for 5 circuits to be mounted on a 10-pin arm requiring only a single ground wire. Easy to install—use only 3 mounting screws. Made by COOK ELECTRIC COMPANY.



Afraid of Winter? Keep your lines in action — your maintenance costs down, with DIAMOND WIRE & CABLE CO.'s RED-D Drop Wire. Superior adhesion, conductivity, tensile strength. Available in Copperweld and Signal Bronze.



Kellogg's Standard Outside Plant Handbook now available at special price while quantities last. Reduced to $2.75 a copy with ten or more copies priced at $2.50 each. Every phase of outside plant telephone pole line construction is covered in book.



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Telephone: DEarborn 2-0750

594 Southland Circle, N.W.
lanta, Georgia
camore 4-2441

The prototype was built by Aleksa of plaster and wood. "In mass production," he said, "it could be made of moulded fiberglass, metal, or plastic. Use of various color combinations would make the booth interesting visually."

The flowing structure rises from a slender pedestal to form a rounded canopy over the user's head. The entire shelter is anchored in a wide flat base that gives it stability. In actual use it could be set in concrete.

In using the booth, a person stands jack-in-the-pulpit-like under the canopy. He faces the inside of the booth. The concave canopy shelters the user from sun and bad weather.

The canopy shell of the booth is shaped so that privacy and comfort are assured, Aleksa states.

A native of Lithuania, Aleska escaped from Russian terrorists in 1944. Entering the United States as a displaced person, he started at Illinois Tech as an evening student.

In 1953, Aleksa enrolled as a full-time student at the Institute of Design, a degree-granting department of IIT. He has been the recipient of a schclarship from the Federal Tool Corp., Chicago. With the aid of scholarships and his wife, whose work helps support them, Aleksa hopes to finish his studies in 1957.

Safety Council Issues New Accident Facts

The 1956 edition of the National Safety Council's statistical yearbook, "Accident Facts," is now available.

"Accident Facts" contains facts and figures on all types of accidents—industrial, traffic, home, farm and school.

Twenty pages of the book are devoted exclusively to occupational accidents and provide the factual background necessary to give direction to an industrial safety program. There is a detailed list of accident rates by major industry groups, as well as charts showing the accident trend during the past 30 years. Most common source of injuries, part of body most frequently injured, off-the-job accident problems, unsafe acts and unsafe conditions contributing to permanent impairments and deaths, and other topics are included.

The 96-page book is an invaluable source of ideas and data for making speeches, writing articles, preparing reports and planning safety campaigns.

"Accident Facts" is priced at $1.00 a single copy and less for quantities. Inquiries should be sent to the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

INVEST IN MODERN PLANT

Concluded from page 28

package units, with maintenance simplified by the use of plug-in units.

Vast Amounts of Capital Needed

I need hardly dwell on the necessity of the vast amounts of future capital which will be required and must be attracted, not only for the full development of this innovation, but for its broad use throughout the country.

Copper pipe may be an important part of tomorrow's transmission picture. Researchers are now working on a brand new concept of inter-city transmission, using the wave guide principle. If the experiments are successful, long pipes buried in the ground as coaxial cable is today, will carry simultaneously, up to 250,000 telephone calls or hundreds of television programs.

Much remains to be done before the wave guide joins coaxial cable and microwave radio relay in the telephone network—repeaters that will work with these broad frequency bands must be perfected and other problems overcome—but it presents interesting possibilities for the increasing demands of the future.

This year marks a milestone in global communications with the completion of the first telephone cable linking Europe and North America (TELEPHONY, Oct. 6, p. 20). This adds 36 static-free voice channels to the radio circuits now spanning the Atlantic.

The new voice submarine cable is 2,000 nautical miles in length and lies on the ocean floor in depths up to 3 miles.

Here is a piece of the cable. Each directional section consists of a coaxial tube covered by copper tape, wrappings of heavy jute, steel armor wires, and an outer wrapping of jute.

The repeaters in this cable—there are 104 repeater units—are spaced about 37 nautical miles apart. In the repeaters, lying on the ocean floor, there are more than 300 long-life electron tubes of this type, tubes designed for a minimum of 20 years of continuous operation. Electrical power for the amplifier tubes are fed to them over the central conductor of each cable from terminal stations on shore.

Back in 1878, Alexander Graham Bell, while in England, tried unsuccessfully to talk to his assistant, Watson, over the transatlantic telegraph cable. The year 1956 will see another one of Bell's dreams become a reality.

Full DDD Near

It's only going to be a few years before nearly everyone can dial any number in the United States. It is enough to challenge the imagination just to think of the incredible machine at the command of a single finger twirling a dial or pushing a few keys. Even more challenging to the imagination is the further research in this area which the transatlantic cable has stimulated.

We are now studying the possibility of automatic pulsing across the ocean to all-dial countries, such as Switzerland and the Netherlands—first by operators, and later perhaps by customers.

How to expand and improve rural service is a problem which I daresay each of us finds well in the forefront when we think of the many problems related to meeting demand. It looks very much as if, in the near future, we may be able, on a practical basis, to make additional and very significant improvements for our rural customers.

As we all know, the use of the carrier principle has meant great savings in outside plant. The cost of this equipment, however, has limited its application to the longer-haul circuits.

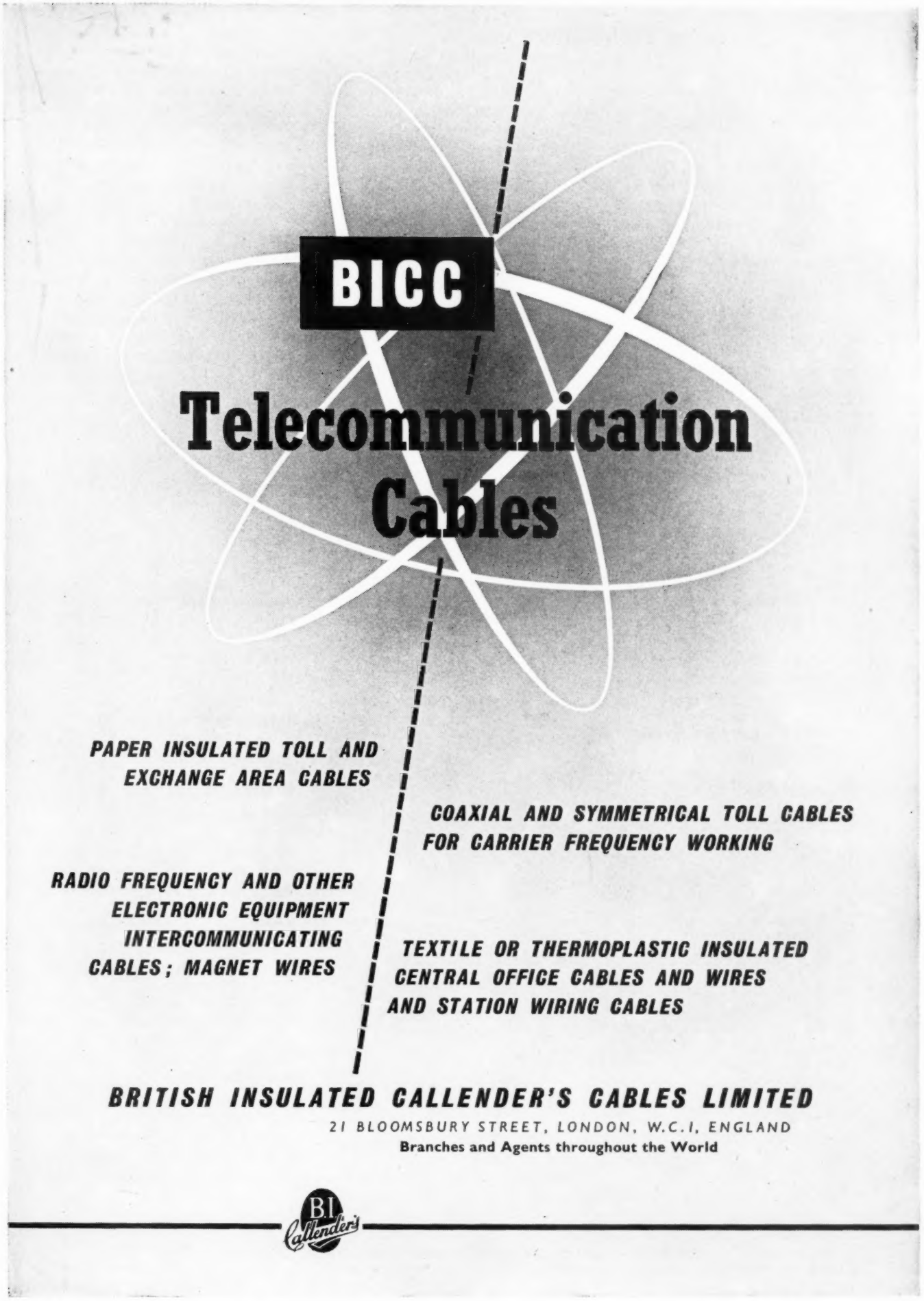
Today, however, a new type carrier system, the P-1 is being developed—and, again, thanks to the transistor—it can be produced at a cost which will warrant its application to rural and other short-haul service. Through its use, an eight-party rural line can be increased in capacity to accommodate an additional 32 customers, thus serving as many as 40 on a single line. Moveover, through the use of this system, a line may carry five conversations simultaneously.

"Seeing Telephones"

These are only some of the exciting possibilities of tomorrow which cast their shadows on what we term the modern plant of today. Taken in total, they point to the possibilities of an ever-broadening service to our customers. Who knows, in the not too distant future, we may even find it desirable and practical to furnish a service which will let people see each other as well as hear each other over telephone circuits.

Bcause of the complexities of current and future trends in our industry, it is clear that in the years ahead even greater integration, greater cooperation and more joint effort will be required between Independent and Bell companies.

Many of the activities in which we are jointly involved, such as Direct Distance Dialing (DDD) and the SAGE


BICC
Telecommunication Cables
PAPER INSULATED TOLL AND EXCHANGE AREA CABLES
COAXIAL AND SYMMETRICAL TOLL CABLES FOR CARRIER FREQUENCY WORKING
RADIO FREQUENCY AND OTHER ELECTRONIC EQUIPMENT INTERCOMMUNICATING CABLES; MAGNET WIRES
TEXTILE OR THERMOPLASTIC INSULATED CENTRAL OFFICE CABLES AND WIRES AND STATION WIRING CABLES
BRITISH INSULATED CALLENDER'S CABLES LIMITED
21 BLOOMSBURY STREET, LONDON, W.C.1, ENGLAND
Branches and Agents throughout the World
BI Callender's

project, to mention only two, heighten the necessity for this close mutual cooperation. I should like to assure you that we, in the New York Telephone Co., will do all in our power, as I know you will, to further the good relations and mutual understanding which I believe exist between us today.

In conclusion, I'd like to say that I personally am convinced that our customers want more and better services and that they are willing to pay for them on the basis of their true value —just as they are willing to pay the true value for the superior products of other businesses. I am also personally convinced that all of us, together, have the know-how and the urge to give our customers these services.

There is no question in my mind but that our ability to give the people of New York State the services they want, in this promising era ahead, and the speed with which we can offer them will be influenced measurably by the economic climate in which each of us must live. Given a healthy one, there is virtually no limit in sight to what we together as partners can do to insure that the people of New York State have communications—communications in the full sense of the word—which are second to none anywhere in the world.

THROUGH EUROPE AND MIDDLE EAST

Concluded from page 23

Using an electric razor in these countries, because of the difference in voltages, can prove quite a chore. We anticipated this and acquired a Swiss razor with an adjustment to take 110, 150 and 220-volts. I found that these voltages are all used. At one hotel in Italy, the voltage was 160, but the 150-volt tap proves satisfactory. However, I found that I had to procure several plug adapters to connect our type into the various designs used. Light bulbs were generally of the bayonet type. There was never any indication as to the voltage, but the light bulbs were usually marked so that the voltage could be identified.

No matter where you go you always see Coca-Cola and Esso oil to remind you of home. You can also generally see a Singer sewing machine sign. In Germany, one chap argued that Singer is a German company and only had a branch office in the United States.

It is amazing to note the number of bicycles, motor scooters and motorbikes that are used in Europe. This is especially true in Germany where people load these small vehicles to the limit and take off for a weekend camping trip. They have nylon tents and inflated sleeping bags and enjoy the outdoors to the fullest extent. The German man also carries a brief case everywhere he goes just like the men in Washington, D. C. The only difference, however, is that in Germany, the brief case contains something of value—the man's lunch.

Taxes must be terrific in most countries. Revenue stamps are attached to bus tickets, hotel bills and even menus in restaurants. Most restaurants and hotels now add a service charge of 10 or 15 per cent to bills which is supposed to replace tipping, except for outstanding service. This does not hinder Americans from tipping, however, because they want everyone to know they are "rich."

We were sorry that time did not permit a trip to the top of the Eiffel tower, but we did get a picture of it at ground level. We were able to take a trip to the top of the Arc of Triumph. I also had a trip to the top of a 692-foot television tower at Stuttgart, Germany.

In Italy, we saw USCITA signs everywhere. We thought at first that this had something to do with the United States Independent Telephone Association, but were later told that it meant "exit" in Italian.

To me, this was a wonderful trip. I covered a lot of ground in a short period of time and, thanks to the airplane, this world is certainly becoming smaller. I learned much, saw a lot of interesting things, and met many wonderful people. I was most fortunate in that I had old friends in practically all the places I visited. These people knew where to go, what to see and what to avoid. I shall never be able to repay these good friends for their kindness and help. I am certain that it does all of us a lot of good to occasionally see how the other half lives. I have always known that ours was the greatest country on earth, but we are all too often prone to take it for granted. After a trip of this nature, we can fully realize our numerous advantages and be better able to properly evaluate them.

Minnesota Fall Conference Features Panel Discussions

More than 175 Minnesota telephone industry men and women attended the second annual Telephone Industry Fall Conference at Curtis Hotel on Sept. 27-28 which was sponsored by the Minnesota Telephone Association, Inc. (MTA).

The two-day meeting consisted of seven panel discussions on key subjects and a demonstration and explanation of new developments in telephony by Eldon Eckles of Blue Earth, MTA president, and John D. Villas, Northwestern Bell Telephone Co., Minneapolis.

Questions from the floor followed each of the panel talks.

The panels were staffed by Independent owners and managers, Northwestern Bell personnel, REA officials, several accountants specializing in the telephone field and two safety experts.

Three of the eight sessions were devoted to accounting and probed such subjects as plant depreciation, cash controls and paystation accounting and analyses of operating statements.

Mr. Eckles and Keith W. Vogt of St. Paul, MTA secretary-treasurer, opened the work conference.

Panels and members:

Depreciation: George L. Streukens, REA, Waconia, chairman; Harvey W. Knutson, public accountant, Quail, Macoubrey & Co., St. Paul; and Randolph Jungman, REA, Minneapolis.

Merchandising: Phillip E. Richards, manager, West Central Telephone Co-op, Wadena, chairman; Toral Duckett, vice president, Central Telephone Co., Lincoln, Neb.; and Lowell V. Plooster, Northwestern Bell, Rochester.

Steps to Take in Dial Conversion: Joseph Kaczmarek of Foley, chairman; William P. Stokesberry of REA, Washington, D. C.; and R. R. Hanson, chief engineer, Minnesota Telephone Co., Minneapolis.

Cash Controls and Paystation Accounting: Dennis J. Keane of Pine Island, chairman; Reynolds Thielen, public accountant, Quail, Macoubrey & Co., St. Paul; and George E. Rohe, division manager, Fairmont and Minnesota Community Telephone companies.

Nationwide Toll Dialing and the 2-5 Numbering System: William A. Preble, Farmers Mutual Telephone Co., Cerro Gordo, chairman; John Hinrichsen, plant superintendent, Pioneer Telephone System, Waconia; and E. G. Nowicki, Northwestern Bell, Minneapolis.

Plant Safety and First Aid: Phillip E. Richards, Wadena, chairman; and Thomas A. Findley and Harold H. Clayton, job training safety instructors, Minnesota Electric Cooperative, St. Paul.

Analyses of Operating Statements: Keith W. Vogt, chairman; Harold R. Bollinger, vice president and general manager, Pioneer Telephone System; and Peter Schwan, section accountant, REA, Washington.

IN THE NATION'S CAPITAL

Concluded from page 19

matic home and will be able to preschedule her day just like a timetable, with each task being performed electronically on time. Weather prediction, for months, of every year, will be made in advance.

Sarnoff even ranged into international political forecasts. He predicted the collapse of Soviet Communism, the effective outlawing of war.

Altogether, it was a thrilling preview, and if only half of it comes true, we will still be living in the age of electronic miracles.

Stromberg Buys Bond Plant For Electronic Center

Purchase of the big, modern Style Manor factory of Bond Stores, Inc., in Rochester, N. Y., by Stromberg-Carlson, a division of General Dynamics Corp., was approved on Sept. 27 by the boards of directors of both firms, meeting separately in New York City.

The 800,000-square-foot plant, the world's largest clothing factory, will become Stromberg-Carlson's electronic center, Robert C. Tait, president, said.

Plans are being prepared to begin moving some of Stromberg-Carlson's facilities into the newly-acquired plant in November, according to Mr. Tait. Eventually the plant will house the company's research-advanced development, electronic engineering and automation departments, electronic production facilities, government contract administration, national television service department, and some warehousing facilities, he stated. These moves will be made gradually over a period of months, as space becomes available, and probably will be completed in April, he said.

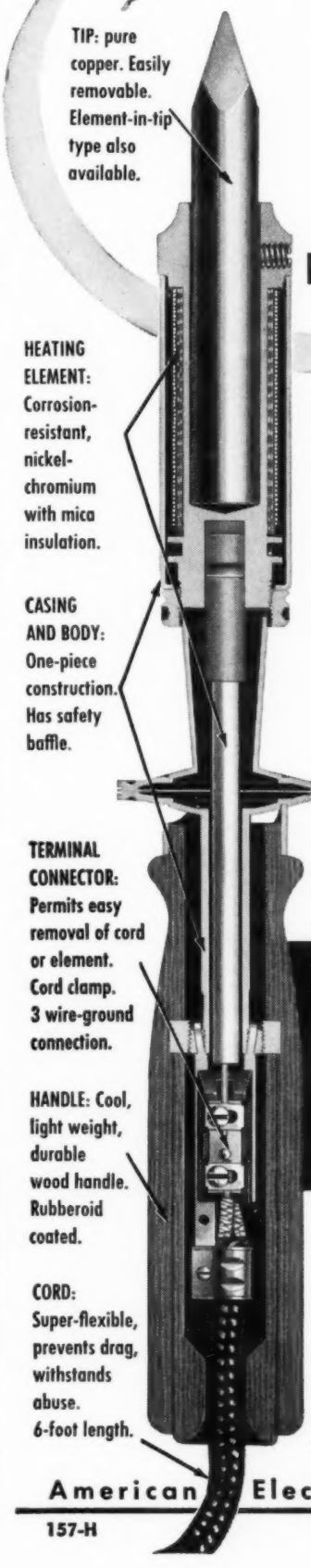
The Style Manor plant is modern in every regard, having been built in 1948-49. It is located on a 57½-acre site which provides 25 acres of undeveloped land that will be available for future expansion, Mr. Tait pointed out.

Transfer of the electronics operations to the new plant will make all manufacturing facilities in Stromberg-Carlson's main plant available for the production of telecommunication equipment. The company's executive offices also will remain in the main plant, in the new 5-million-dollar building now under construction, according to Mr. Tait.

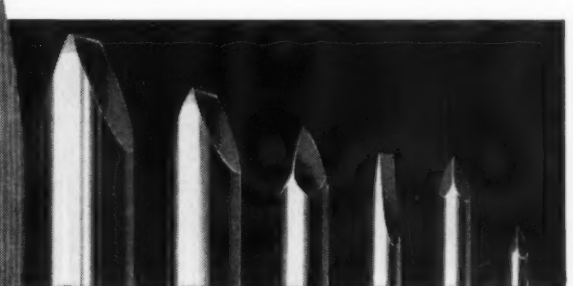
Bond's will transfer manufacturing operations from Style Manor back to the company's Martin Street plant in Rochester, N. Y., according to Barney S. Ruben, president.

American Beauty
ELECTRIC SOLDERING IRONS

LONG-LIFE, Quality IN EVERY DETAIL


TIP: pure copper. Easily removable. Element-in-tip type also available.
HEATING ELEMENT: Corrosion-resistant, nickel-chromium with mica insulation.
CASING AND BODY: One-piece construction. Has safety baffle.
TERMINAL CONNECTOR: Permits easy removal of cord or element. Cord clamp. 3 wire-ground connection.
HANDLE: Cool, light weight, durable wood handle. Rubberoid coated.
CORD: Super-flexible, prevents drag, withstands abuse. 6-foot length.

MORE THAN 60 YEARS of constant testing and improving have produced the very best soldering irons money can buy—American Beauty! Craftsmen trust their *quality*, whether it's the rugged 550 watt model with 1⅛" tip or the featherweight pencil type with ⅛" tip. A complete range of sizes and types, with replaceable, hi-efficiency plug type tips handles any type of soldering job in shop, service or full scale production. Available in standard voltages and for 32 volts. Also models for 6, 12, 24 and 64 volts.



STANDARD COPPER TIPS, heavily nickeled to resist corrosion. Pyramid or chisel-shaped. Many sizes and shapes available. Write for descriptive literature or see your Electronics Jobber.

American Electrical Heater Company — American Beauty ELECTRIC IRONS SINCE 1904

157-H DETROIT 2, MICHIGAN

day in day out

The "bread and butter" of the telephone business is the everyday calls friends and neighbors make to each other. Fostering this everyday use of the telephone is an important part of the Bell System's continuing promotion program.

The advertisement on the opposite page will, during October and November, remind millions of Americans of the rewards of keeping in friendly touch by telephone. It will help promote the day-in, day-out use of the telephone in areas served by *all* of the nation's telephone companies.

XUM

"IT'S FUN TO PHONE"

"SO GLAD YOU CALLED"

"IT'S GOOD TO HEAR YOUR VOICE"

"THE DANCE WAS SWELL"

Just calling up can brighten your day

The telephone can be priceless in emergencies. It's the world's best helper when it comes to saving time, trips and trouble.

But one of its greatest uses has nothing to do with sudden need or calls to the grocer, dentist, hairdresser, electrician, department store, etc.

It's to bring friends and families together.

Just to be able to lift the receiver and talk to others is one of the joys of the telephone.

Isn't there some news you'd like to share with someone right now? And hasn't that someone some news you'd like to hear?

A telephone call that costs so little can do so much to brighten the day at both ends of the line.

BELL TELEPHONE SYSTEM

TUNE IN "TELEPHONE TIME"...the TV program with John Nesbitt's real life stories the whole family can enjoy together...every Sunday over CBS

XUM

construction and maintenance DIGEST

- Able cable
- Efficiency with low power
- Round the clock
- Block that bolt
- Pennies for power

Published every week to help you get the most out of your materials and supplies dollar

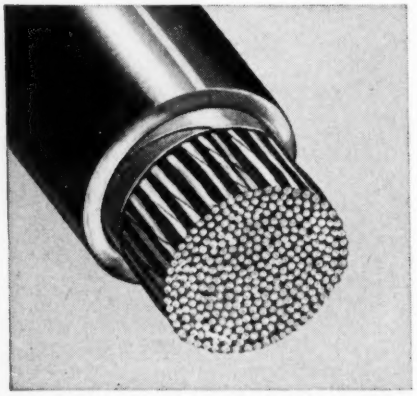
by C. J. Reynolds, Stromberg-Carlson Company

Two dividends are yours when you order supplies from Stromberg-Carlson. First, you get the protection of a double guarantee—ours and the maker's. This assures you of getting the finest products, backed by our 62-year reputation. Second, your support is used to further the art of telephony. We're knee-deep in this industry as a full-time job, not a side line, and your supply business plays a big part and helps us continue our research for new and better telephone equipment.

Uniformity, Dependability, Lasting Service

When you've said that about cable you've covered about everything.

Kennecott Telephone Cable fills the bill in uniformity, dependability, lasting service for our telephone cable customers.



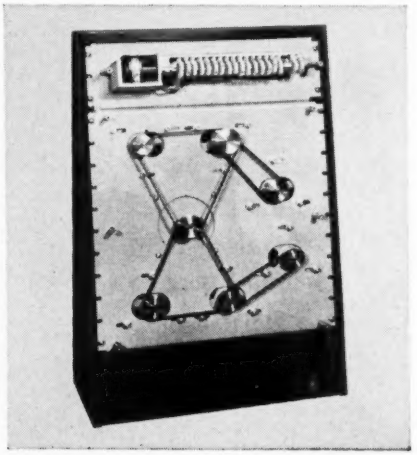
Before a single inch of Kennecott cable leaves the mill, it is tested for Dielectric Strength, Insulation Resistance, Conductor Resistance, Capacitance and Fixed Dimensions. Such care in manufacture is your warranty of efficient, trouble-free performance in the field.

Specify Kennecott — distributed by Stromberg-Carlson.

Ringing panel uses only 360 watts

The full-load power consumption of the AC Ringing Panel shown here is only 360 watts, regardless of output frequencies.

This low power consumption allows the machine to operate continuously without excessive operating costs.



New ringing panel — either AC or DC driven.

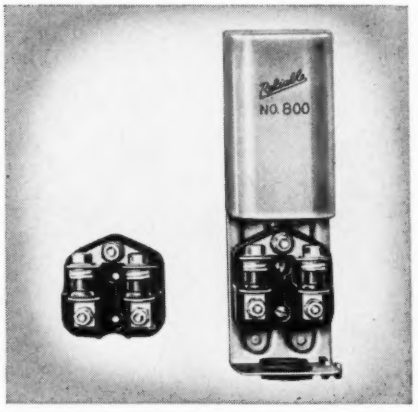
The new Holtzer-Cabot 25 Watt Multi-Frequency Ringing Panel is available either AC or DC driven for all the standard frequencies—harmonic, synchromonic, or decimonic.

Since the generated frequencies of the primary and standby machines have identical wave-shapes, ringers adjusted to the primary unit will ring equally as well on the standby unit.

Available as optional equipment are AC and DC motor-driven interruptors, and tone generators for dial and busy tone and ring-back tone.

Guard your stations with these fuseless protectors

Shown here are two models of fuseless station protectors—both designed to guard your stations 24 hours a day, requiring no maintenance or attention at all.



No. 700 protector—for indoor use.
No. 800 protector—has weatherproof housing for outdoor installation.

The No. 700 is built for indoor use. You'll find its workable design combined with small size are just what you need.

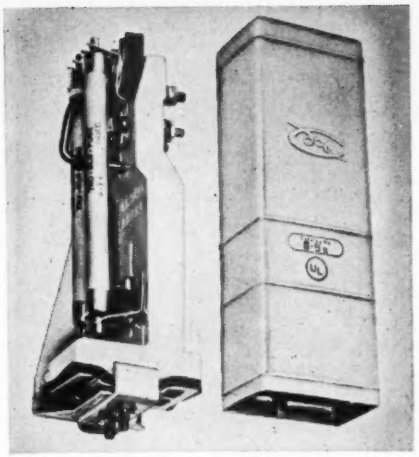
No. 800 is weatherproofed for trouble-free outdoor mounting.

Both models are approved and listed by the Underwriters' Laboratories, Inc., for use where installations meet the requirements of the National Electrical Code (see Article 800). Each of them mounts two Reliable No. 504 self-contained, weatherproofed screw-in type protector units, which house carbon electrodes spaced approximately .0035" for air gap.

Manufactured by Reliable Electric Co.

Protect telephones from lightning

No larger than a good-size candy bar is the Cook 09u telephone protector shown here. But it can save you a lot of grief and you can protect single circuits, both indoor and out.

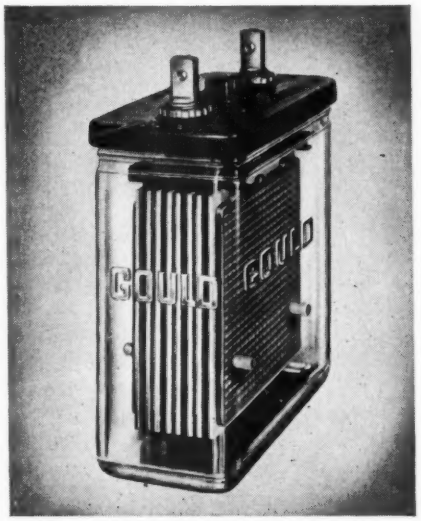


Individual circuits are protected by small unit, measuring 6"x2½"x1¾".

The body is a single piece of heavy white glazed porcelain. Lightning arrestors are two Tru-Gap dischargers, two flat carbons mounted on a copper ground, and two A-9u 7-amp. lavite fuses. Neoprene gasket locks out insects, dust, snow, etc.

Battery has lowest yearly cost

There's an easy way to save money on switchgear, signal and alarm systems or emergency light and power applications.



Gould Planté rolls up excellent service records—cuts maintenance to a minimum.

Amazing service records have proved that Gould Planté batteries have the lowest yearly cost of any battery you can use. Pure lead positive plates help make this possible.

Distributed by

STROMBERG-CARLSON

A DIVISION OF GENERAL DYNAMICS CORPORATION

Sales Offices: Atlanta 3, Chicago 6, Kansas City 8, Rochester 3, San Francisco 3.

Exhibit Promotes Toll Usage At Florists' Convention

"WE SPEED Flowers by Telephone," the slogan of the Teleflora emblem, provided an interesting and colorful theme for General Telephone Co. of California's booth at the recent convention of the California State Florists Association held at the Miramar Hotel in Santa Barbara from Sept. 13 through 17.

Decorated with philodendron, rubber plants and other luxuriant tropical foliage, the exhibit was visited by approximately 1,500 people, mostly florists from various parts of the state. Installed to promote the use of toll calls in ordering flowers from distant or remote areas, the booth displayed colored instruments in eight color tones; an electronic secretary and a hands-free instrument.

Two commercial employes manned the booth at all times and answered questions.

The most frequent query, "What advantage does 'telephoning for flowers' have over other communications services?" was adequately answered by General's representatives by enumerating the following points:

"Flowers by telephone" provides a two-way service and clears up all questions on one short call.

Permits the florist to give his customer special service ("Let's call now and assure prompt delivery.")

Long distance is low in cost.

When florists use long distance they make telephone friends, get to know one another and this generates business on a reciprocal basis.

As a direct result of this exhibit, in addition to toll promotion sales, several sales of the exhibit items were made.

One florist seemed to sum up the sentiments of the 1,500 people who visited this booth, when he said:

"This is a wonderful idea—I don't know why I didn't investigate 'flowers by telephone' before."

IT&T Buys Royal Electric And Its Subsidiary

Purchase by International Telephone & Telegraph Corp. of the assets of Royal Electric Co., Inc., Pawtucket and Woonsocket, R. I., and its subsidiary, Electric Cords & Supply Co., Inc., of Los Angeles, Cal., was announced on Oct. 3 by Edmond H. Leavey, president of IT&T.

Founded in 1921 by Joseph and Myer Riesman, Royal Electric has been engaged in the manufacture of insulated wire and cable, cord sets, wiring devices and fuses, distributed throughout the United States and Canada.

The main plant at Pawtucket consists of 300,000 square feet of factory space in which 650 persons are employed. In addition, a leased plant in Woonsocket, R. I., has 80,000 square feet and 150 employes. In the Los Angeles operation, 40 persons are employed in a facility consisting of 27,000 square feet of leased space.

IT&T has formed a new subsidiary, Royal Electric Corp., which has retained the services of Robert Riesman and Max Alperin, who were president and executive vice president respectively, of the parent company, and who will continue in these same capacities in the new company as well as serving together with Joseph Riesman on the board of directors.

Homelite to Construct Factory in Gastonia, N. C.

Homelite, a division of Textron Inc., of Port Chester, N. Y., has announced plans to build a 135,000-square-foot one-story factory building in Gastonia, N. C., for the production of its gasoline-powered chain saws.

Construction of the new plant—expected to cost about 2 million dollars—will begin in November and full operation is expected by the fall of 1957.

The production of Homelite's gasoline-engine-driven pumps and generators will continue at the present factory. Homelite's main office, which includes all general office, sales and engineering functions will also remain in Port Chester.

L. Lincoln Named Manager, Koiled Kords Central Sales

E. L. Love, vice president in charge of sales, Koiled Kords, Inc. announces two changes in the sales staff of the company, as part of the company's expansion of the sales service branch.

Loomis Lincoln who has been handling industrial sales of Koiled Kords

retractile cords from the home office in New Haven, Conn., has been transferred to Chicago to become district manager covering the central states. In his new capacity Mr. Lincoln also will handle retractile communications cords and other products handled by the Koiled Kords organization. His office will be with Reliable Electric Co., 3145 Carroll Ave., Chicago 12, Ill., telephone VAn Buren 6-0020.

Replacing Mr. Lincoln in the home office, is William Bloomquist who has spent four years in the Whitney Blake Co. laboratory on research, development and design of retractile cords. Mr. Bloomquist is a graduate of Quinnipiac College and of Upsala College from which latter he earned B.S. and B.B.A. degrees.

S. C. Alexander Joins C & D Michigan Office

Stanley C. Alexander has been appointed a sales representative to the Dearborn, Mich., office of C & D Batteries, Inc., the Conshohocken, Pa., firm announced.

Mr. Alexander, with 23 years' experience as a supervisor of industrial trucks and highway equipment for Fisher Body, has also worked on experimental handling equipment.

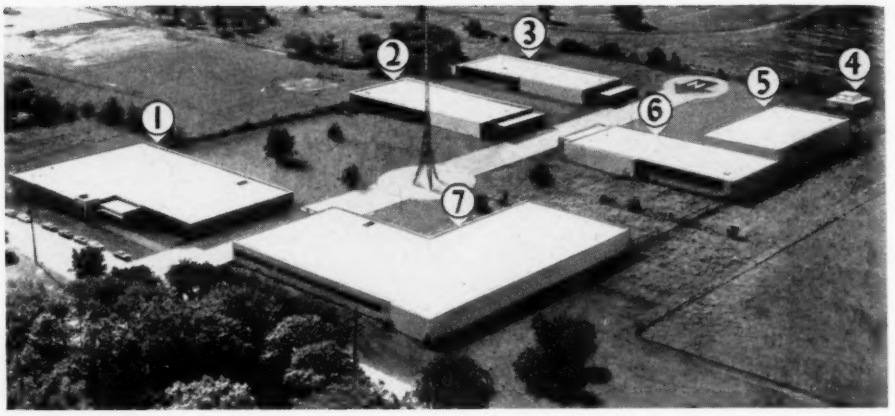
The new C & D salesman is a member of the Materials Handling Association.

Copperweld Annual Report Wins Award for Excellence

In the final ratings by an independent board of judges in the 16th annual survey of *Financial World*, national weekly magazine, Copperweld Steel Co. was judged as having the best annual report of the Small Steel Companies. The bronze "Oscar of Industry" will be presented to the company at the annual awards banquet in the grand ballroom of the Hotel Statler in New York on Oct. 29. Two years ago, Copperweld was awarded a similar "Oscar." Last year, the company was runner-up for top honors in its group.

A total of 5,000 annual reports were entered this year in the international competition. Around 1,700 reports qualified for the final screening and these were judged in 100 industrial classifications for bronze trophies.

Weston Smith, originator and director of the annual report surveys, will present the Oscars of Industry at the awards banquet, which will attract some 1,400 business and financial leaders from all over the United States, Canada and Latin America.



Architect's conception of present and scheduled buildings for the new Cook Technological Center at Morton Grove, Ill. Covering 158,000 square feet of floor space on 15 acres, the center will include a heliport (N), experimental tower (center) and paved parking for 1,200 cars. Building identifications and scheduled occupancy dates are the following: (1) Cook Research Laboratories administration building—October. (2) Inland testing laboratories administration and reliability test section building—October. (3) Inland Testing Laboratories environmental laboratories building—June. (4) Inland Testing Laboratories radiation test building—March. (5) Inland Testing Laboratories heavy environmental test building—June. (6) general services building—January. (7) Cook Research Laboratories general laboratories building—January.

Cook Electric to Open Huge Industrial Science Center

One of the largest industrial science centers in the United States will be opened by Cook Electric Co. starting in early October, it was announced on Sept. 21 by Walter C. Hasselhorn, president.

The new Cook Technological Center will be operated by more than 1,000 research scientists, engineers, technicians and other staff personnel, working in seven single-story buildings with a total floor area of 158,000 square feet.

The seven air-conditioned and acoustically treated buildings that are now scheduled and under construction are located on a 15-acre tract in Morton Grove, Ill., a suburb northwest of Chicago. Included in the center are a heliport and paved parking facilities for 1,200 cars.

Cook Electric Co. divisions include: Cook Research Laboratories (basic and applied research in nuclear physics, servo-mechanisms, upper air studies, weather reconnaissance, radar, sonar, rockets, guided missiles); Inland Testing Laboratories (testing of components for the company, other manufacturers, and the Defense Department); electronic systems (engineering and production design of components and test equipment for military aircraft and guided missiles); Diaphlex (aircraft components manufacture); MagniLastic (stainless steel and alloy specialties manufacture); Wirecom (wire communications equipment manufacture); and AirMod Corp., Vandalia, O., wholly-owned subsidiary (aircraft modernization and modification).

Initial occupancy of the Cook Technological Center will be made by advance teams of Cook Research Laboratories and Inland Testing Laboratories next month.

In addition to four plants in Chicago, Cook Electric operates plants in Skokie, Ill., Vandalia, O., Dayton, O., and Toronto, Ont.

The company also maintains engineering offices in the following cities: New York, N. Y., Baltimore, Md., Boston, Mass., Washington, D. C., Trenton, N. J., Fairview Park, O., Dayton, O., Pittsburgh, Pa., Indianapolis, Ind., Wichita, Kan., Minneapolis, Minn., St. Louis, Mo., Seattle, Wash., Glendale, Calif., Denver, Colo., Dallas, Tex., El Paso, Tex., Atlanta, Ga., and Knoxville, Tenn.

Establish Radio-Telephone Service, India-to-Australia

A new direct radio-telephone service has been established between India and Australia, an Oct. 1 report from New Delhi, India, stated. Australia is the 17th country to be reached by direct oversea contact.

New Zealand, the Philippines, and Ceylon are reportedly the next countries to be added. The Indian director-general of overseas communications has announced plans to establish regional oversea communications centers at Bombay, Calcutta, Madras, and New Delhi. A permanent radio-telephone center has been inaugurated at Calcutta.

Close-up of a sound and *profitable* management investment!

CLEAN PENTA-TREATED POLES LAST 30 YEARS OR LONGER

Your investment in Penta-treated poles pays off year after year: Penta actually immunizes poles against rot, termites and other wood-destroying pests for *3 decades or more*. Pole replacements are cut to the bone because wood stays sound and solid and on the job . . . season after season. And Penta protection is lasting; the preservative can't bleed or leach out.

Why guess? Measure Penta protection accurately. Because Penta is a uniform chemical compound, increment boring tests give you dependable, accurate information as to the amount of Penta protection in your poles.

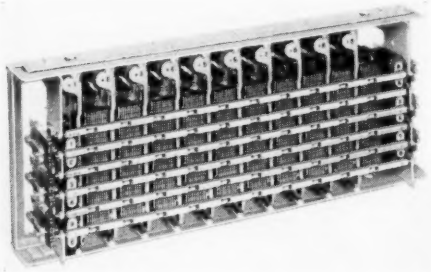
Penta "protects" your public, too! There's no preservative bleed-out to stain clothing when you use clean Penta-treated wood. Good public relations. Good *personnel* relations, too, as your linemen will tell you.

FOR YOUR FREE COPY of "Penta for Poles and Crossarms," write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, Dept. PI-9, St. Louis 1, Missouri.

MONSANTO

News on New Products

CROSSBAR SYSTEM—North Electric Co. announces that its new "By-Path" crossbar telephone system is now available for all Independent companies. All crossbar switches and other components of the system are completely manufactured in the United States by North Electric. Production facilities, according to the company, have been more than doubled in the past 18 months to accommodate the production of the crossbar systems and other North products.



Installation of the common control "By-Path" crossbar switching system has been under way for several months for the first Independents to utilize this new system—Indiana Telephone Corp. at Seymour, Ind., and Mansfield (O.) Telephone Co.,—the company stated. The Seymour exchange will consist of 2,500 lines while the Mansfield installation calls for 8,000 lines. Request NP575.

•

TELEPHONE ANSWERING EQUIPMENT — New concentrator-identifier equipment designed to enable Independent telephone companies to supply facilities to telephone answering services in their area is being manufactured by Automatic Electric Co.

The new equipment is being produced in 100-line units, and will be compatible with Bell System equipment so that cross boundary service can be furnished, the company stated.

Surveys of the telephone answering field, made by the manufacturer, show that the practice of using individual cable pairs between the answering service and the telephone central office normally is satisfactory only if the two are close together. Even for medium sized installations, the mileage to the answering service may be too costly. In the new equipment, only four cable pairs are required to serve 100 lines, resulting in a 96 per cent reduction in copper wire, the announcement states. Also the possibility that the answering service may move to another location makes economical planning of cable layout by the telephone company difficult because of the large number of pairs involved. The problem is further aggravated, the company reports, by increased crowding in city areas which frequently makes suitable office space close to a telephone central office hard to find.

Three-position switchboard for telephone answering service of Pomona Medical Exchange, Pomona, Cal., showing designation strips for customer's name and business, telephone number and answering terminal number, with "pigeon holes" for special information.

Concentrator-identifier equipment, designed by Automatic Electric to solve these problems, consists of two major units.

Terminating equipment in the office of the telephone answering service of the Pomona Medical Exchange. This equipment receives pulse identification of a calling subscriber and identifies the line at the telephone answering switchboard.

The first unit is the originating facility. This equipment is located in the telephone company's central office to provide identification and concentration of the customer's lines.

The second unit is the terminating facility, located in the office of the telephone answering service. This equipment receives pulse identification of a calling subscriber and identifies the line at the telephone answering switchboard.

The other element of equipment is a PBX board in the telephone answering service office, normally modified to provide large designation strips at each line, showing the subscriber's name and business, telephone number and answering terminal number. These frequently are augmented by ticket pockets, or pigeon holes, one for each subscriber, containing special information that hangs from a shelf projecting out over the top of the switchboard. Different colored tickets may be used to denote different types of instruction.

At the telephone company central office, the originating unit is connected to the subscriber's lines by jumpers at

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP575_____; NP576_____; NP577_____; NP578_____;

NP579_____; NP580_____.

Name ..... Title .....

Company .....

Street .....

Town and State .....

10/20/56

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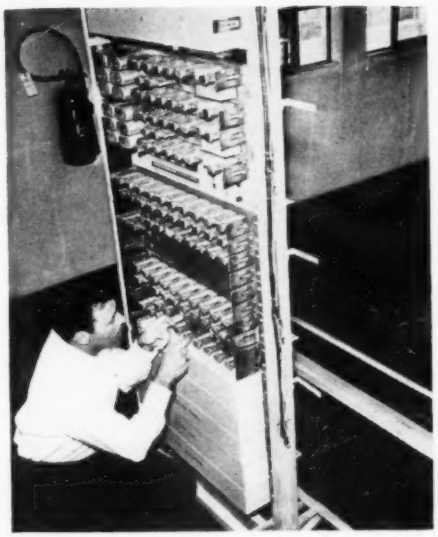

Originating equipment located in the Chino central office of the Pomona exchange to provide identification and concentration of the customer's lines.

the mainframe. When a calling party is connected to a subscriber's line, ringing on the line causes the originating information to select an idle trunk to the answering service switchboard, and transmit a series of coded pulses to the switchboard to light the signal lamp associated with the called line.

When an operator at the telephone answering service plugs an answering cord into the jack associated with this lamp, a connection will be established to the calling subscriber. If the operator does not answer during the period that the line lamp is on, the equipment will release, and the connection and indication of the line will be reinstated on the next application of the ringing generator at the telephone central office to this subscriber's line.

Should the telephone answering service operator plug in on the subscriber's jack during the time the lamp is dark, the talking path will not be completed until the line is again identified.

This "called-line" scanning feature has been made independent of talking path availability and, therefore, when all talking paths are busy, the equipment continues to cause line lamps associated with other incoming calls to flash. This gives the telephone answering service operator a choice in answering calls, and to answer only after a given number of indications as may be requested by the customer.

Although 100 lines is the maximum size of any one unit, additional units can be installed side by side if desirable for increased capacity. Where fewer than 100 lines are required, a small number of lines can be equipped initially: with additional lines added later in groups of ten until the ulti-

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Tel. Diamond 1-9212

mate capacity of 100 lines is reached. Request NP576.

•

MOTOR TOBOGGAN—The Eliason motor toboggan Model K-12, featuring automatic clutch and transmission and ability to perform snow tasks previously accomplished only on skis, snowshoes, or by dog team, again is in production this fall by the Four Wheel Drive Auto Co.

The motorized sled is capable of towing loads of up to 1,000 pounds, depending upon snow conditions, and will operate for hours on its self-contained fuel supply at speeds of 5 to 25 miles an hour. Its only controls are an automotive-type steering wheel and hand throttle.

Ideal for over-the-snow transport of utility line inspection and maintenance crews, and technical survey teams, the K-12 motor toboggan utilizes a Briggs-Stratton single cylinder, four-stroke cycle air-cooled engine with 8¼ horsepower rating at 3,200 RPM.

The toboggan is driven by an endless, cleated track which is forced into snow by the pressure of the power unit on the track, which is spring loaded for shock protection. Two steering skis mounted on the under-surface of the toboggan runners provide a turning

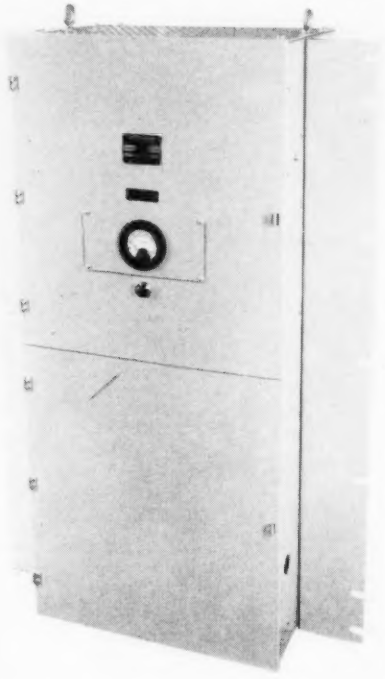
radius of approximately 12 feet.

FWD, which manufactures four and six-wheel-drive heavy-duty trucks, said that the toboggan, in addition to accommodating two persons, has a tow bar which can be utilized to pull sleds carrying other personnel, supplies, or work materials. Request NP577.

•

BATTERY CHARGERS—A new line of Rectricharger (R) battery chargers, designed specifically for the telephone industry, has been announced by Raytheon Mfg. Co.

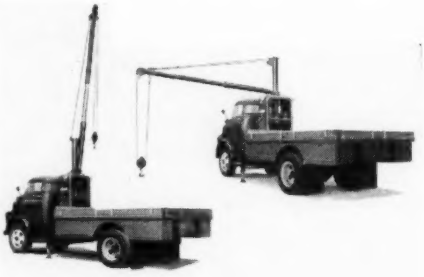
The new battery charger line consists of 48-volt equipment available in a wide range of current ratings. Claimed for the new chargers are three important advantages: Magnetic amplifier control of both input and output; no audible hum at output terminals; automatic compensation for rectifier aging. Available from stock are 6 and 12-ampere single phase, and 25 and 50-



ampere three-phase models. Other models in various capacities are promised for early delivery. Request NP578.

•

TRUCK HYDRAULIC CRANE—The addition of a truck-mounted hydraulic crane to its line of utility bodies and equipment has been announced by the Powers-American Division of McCabe-Powers Auto Body Co.



The unit, which has been designated "Load-Master," has a rated capacity of 4,000 pounds. It is designed for installation on any chassis having a cab-to-axle dimension of at least 84 inches, and requires only 20 inches of mounting space behind the truck cab.

All movement is hydraulically actuated. Power is derived from a hydraulic pump, driven by a power take-off installed on the truck transmission. All operations are controlled by one man, with levers which are normally installed on the crane superstructure to afford

WAVE FILTERS AND OSCILLATOR NETWORKS FOR FREQUENCY-DIVISION MULTIPLEX SYSTEMS

Radio Engineering Products are leading designers and manufacturers of advanced-technique wave filters and bridge-stabilized oscillator networks for the voice-frequency and carrier-frequency ranges. These filters are mostly miniaturized in hermetically-sealed cases, and meet applicable military specifications. Standard units currently produced include those listed below. Delivery is from stock.

Service	Type	Function	Spacing	Range	No. of chans.
A-M Carrier-Telegraph	F2124	Send filter	170 cycles	255-4835 cycles	28
"	F2125	Receive filter	170 "	255-4835 "	28
"	F9610	Oscillator network	170 "	255-4835 "	28
"	F6131	Send filter	120 "	300-4980 "	40
"	F8261	Receive filter	120 "	300-4980 "	40
"	F9631	Oscillator network	120 "	300-4980 "	40
F-S Carrier-telegraph, S+Dx	F11294	Send filter and oscillator network	120 "	3120, 3240, 3360 "	3
"	F11291	Receive filter and discriminator network	120 "	3120, 3240, 3360 "	3
"	F11209	Low-pass filter	—	0 to 2950 "	—
Carrier-Telephone (Type C System)	F15002	Channel filter	approx. 3 kc.	3-32 kc.	8
Carrier-Telephone (Type C System)	F15340	Oscillator network	approx. 3 kc.	3-32 kc.	8
Carrier-Telephone	F9511	Channel filter	4 kc.	4-36 kc.	8
"	F9520	Oscillator network	4 kc.	4-36 kc.	8
Carrier-Telephone (Type C System)	F2121	Line filter and balancing network	—	5-kc. crossover	—
Carrier-Telephone (Type C System)	F8910	Line filter and balancing network	—	3-kc. crossover	—
Carrier-Telephone (Type H System)	F1922	Line filter and balancing network	—	3-kc. crossover	—

We will promptly supply full information on these and other types on request.

RADIO ENGINEERING PRODUCTS

1080 UNIVERSITY STREET, MONTREAL 3, CANADA

Telephone: UNiversity 6-6887 Cable Address: Radenpro, Montreal

MANUFACTURERS OF CARRIER-TELEGRAPH, CARRIER-TELEPHONE AND BROAD-BAND RADIO SYSTEMS

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- ✓ *Superior abrasion resistance*
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- ✓ *Low water absorption*
- ✓ *Wider temperature range*

"Alathon" polyethylene resin has excellent dielectric strength and resistivity — even under conditions of high humidity and over a wide frequency range. It also has a low loss factor.

These electrical properties combined with good mechanical properties and resistance to heat, chemicals and moisture make Du Pont "Alathon" outstanding for insulation and jacketing applications in the communication field. For more information on "Alathon" mail coupon below.

There is a difference in polyethylene resins . . . specify **ALATHON®** *for your insulation and jacketing needs.*

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In Canada: Du Pont Company of Canada Limited, P. O. Box 660, Montreal, Quebec

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Please send me more information on Du Pont "Alathon" polyethylene resin:

Uses ☐
Processing Techniques ☐
Properties ☐

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Position _____
Firm Name _____
Street Address _____
City _____
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NOW... CHANCE PIKE POLES ARE LAMINATED!

For greater uniformity... greater rigidity!

Now...Chance Pike Poles are made by bonding together carefully selected Douglas fir boards. Laminated Pike Poles have many advantages over the old, single board pike pole. They're more rigid. They're more uniform. Each board reinforces the other.

SAFETY PIKE — *Point can be reversed as shown in circle, for safety in handling and transporting between jobs.*

PLASTIC PROTECTED

Chance *laminated* Pike Poles are available with tough Maplac plastic coating. Splintering of the wood is eliminated. Lost-time hand injuries, caused by splinters, are avoided.

IT PAYS TO BUY HIGH QUALITY IN A PIKE POLE. Only on a Chance pike pole will you find the steel reinforced butt which protects the end of the pike. And only *laminated* Chance pike poles are available with Maplac protection.

Write for the full story today.

CT55-1A

A·B·CHANCE CO·
CENTRALIA, MISSOURI
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operator an unobstructed view of the boom at all times.

The Load-Master consists of a hydraulic ram anchored to a supporting mast, a hydraulic winch, and hydraulic outriggers. Support cables are extended from outer end of the ram to top of the mast, and the fixed length of these cables causes the boom angle of elevation to change as the ram is extended or retracted.

The hydraulic winch is driven by the truck engine through the power take-off. A hydraulic outrigger cylinder, with swivel-mounted foot plate, is installed on each side of the truck to furnish extra stability for side loading.

A load cannot drop, even though the truck engine stalls. Hydraulic system requires intentional movement of controls before load position can be changed. A relief valve prevents overloading.

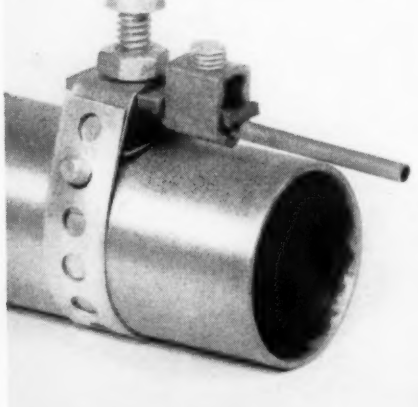
The Load-Master crane is suited for use with the company's Series 300 Body (see cut), which is normally furnished with underfloor compartments, removable retainer boards, and steel skirting panels over wheels, as shown. The unit can also be furnished in combination with other standard bodies in the line, or with special equipment designed to fit individual work requirements.

Brooke Daly, company vice president, pointed out that, in addition to its time-saving value in loading and unloading operations, the Load-Master is well suited for use in many utility hoisting jobs, and in line construction work for setting poles up to 45 feet in length.

A boom extension, to increase length of the boom up to 22 feet, can be furnished as an optional item. Request NP579.

•

GROUND CLAMP—A new adjustable ground clamp, designated Part T-1-SL, has just been placed on the market by Blaco Mfg. Co.



The clamp consists of a ½ inch wide tinned, pure copper perforated strap to which a tang is soldered holding a connector to accommodate No. 14 to No. 4 wire. The clamp is adjustable to fit ⅜ inch to 1¼ inch steel pipe or ⅝ inch to 1½ inch OD copper pipe. An exclusive intermediate-tightening screw draws up slack to contract the band around the pipe. A "shield" rests between the end of the tightening screw and pipe. Request NP580.

Western Electric Names A. B. Goetze President

At a special meeting of the board of directors on Sept. 26, Arthur B. Goetze was elected president of the Western Electric Co., succeeding Fred R. Kappel, who recently was elected president of the American Telephone & Telegraph Co.

Mr. Goetze has been a vice president of the company since 1952 and a director since 1953. He is succeeded by Paul A. Gorman, who has been vice president-finance. At the same meeting the board elected Paul R. Brousse a vice president. Mr. Brousse, who for the past year has been comptroller of the company's manufacturing division, will replace Mr. Gorman as vice president-finance.

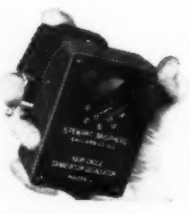
Stewart

TEST EQUIPMENT

Locates Line Trouble FAST

1000 Cycle TRANSISTOR OSCILLATOR

Model J



A Stable power source, for locating trouble in carrier systems and audio equipment.

Self contained mercury battery with operating life over 700 hours.

Pocket size, 2¼"x3"x4", Wt. 10.3 Oz.

STEWART BROTHERS
Division of Instrument Laboratories
Chicago 10, Illinois

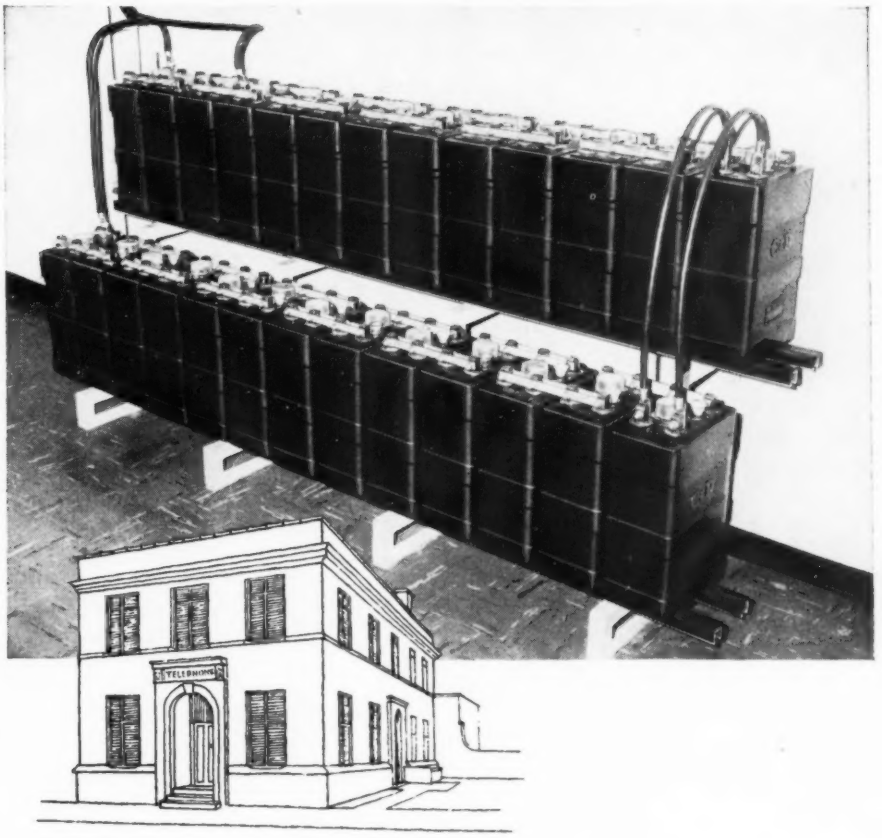
A. B. GOETZE

P. A. GORMAN

Mr. Goetze has been vice president in charge of manufacturing since May of this year. He started with the company in 1917 as draftsman at its Hawthorne Works in Chicago and studied electrical engineering at Armour Institute of Technology. In 1922, Mr. Goetze became a drafting supervisor and the following year helped in development of a scientific method for pre-determining the amount and cost of equipment engineering and drafting effort required on a job before it was undertaken. The basic principles of this unit cost system of control are still used by the company today.

After advancing through positions of increasing responsibility Mr. Goetze served as manager of several manufacturing locations and personnel director of the company.

In 1949 he was elected personnel vice president of the Chesapeake & Potomac Telephone Cos. and in 1950, operating vice president and a director of the Ohio Bell Telephone Co.



Creston Mutual Telephone converts to XY dial system

installs C&D PlastiCal® batteries for extra-long life!

The Creston Mutual Telephone Company, Creston, Iowa, is proud of its new Stromberg-Carlson XY dial system. And—the accompanying batteries shouldn't require replacing for 25 years, because Creston installed PlastiCal®—C & D's lead-calcium* battery.

Here in the heart of America's corn belt, Creston serves 4250 subscribers from offices in Creston, Orient, and Spaulding. In choosing famous C & D PlastiCal batteries Creston obtained:

1. **One-piece, permanently-sealed plastic case. Entire unit is shock-resistant, lighter, and more compact than glass or rubber.**
2. **Exclusive suspended and supported plate construction eliminates leaks due to internal stresses.**
3. **Easier maintenance, because patented Post Seal eliminates acid creepage.**

Get complete details!

Bulletin T-528 gives the full story on extra-long life C & D PlastiCal batteries. Bulletin T-527 has complete facts on C & D PlastiCell (lead-antimony) batteries.

**A development of the Bell Telephone Laboratories*

C&D BATTERIES, INC.
of Conshohocken, Pa.
SINCE 1906

50th ANNIVERSARY

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

Returning to Western Electric in 1952, Mr. Goetze was elected vice president and became works manager of one of the company's major plants at Kearny, N. J., and subsequently of all manufacturing in the eastern area. In 1954 he was placed in charge of the company's finance division.

In addition to being a member of the Western Electric board of directors, Mr. Goetze is also a director of Sandia Corp., Bell Telephone Laboratories, Nassau Smelting & Refining Company, Teletype Corp. and Northern Electric Co., Ltd., Canada.

During World War I he served in the United States Navy.

Mr. Gorman, a native of Missouri, joined Western Electric in 1929 in Chicago upon graduation from the University of Missouri. He has held a number of important Bell System assigments including assistant vice president of AT&T, central distribution manager for Western Electric, personnel director of the company, and vice president defense projects. He has been a Western Electric director since 1955.

Mr. Brousse joined the Bell System in 1926 as an accounting clerk at the Bell Telephone Laboratories in New York City and transferred to the commercial department of Western Electric in New York City three years later. He became chief of statistics in the company's specialty products division at Kearny, N. J., in 1941 and subsequently rose through positions of increasing responsibility in the distribution and manufacturing fields to his present post in 1955.

Kellogg Appoints McDonald And Boyd to New Posts

George T. Scharffenberger, president, Kellogg Switchboard & Supply Co., Chicago, a division of International Telephone & Telegraph Corp., announces the appointment of Henry J. McDonald as secretary and general counsel and William F. Boyd as director of industrial relations.

Mr. McDonald, formerly assistant secretary and assistant treasurer, will retain the latter position in addition to his new responsibilities. As general counsel, he will have charge of Kellogg's newly created law department which combines the activities of both patent and general law.

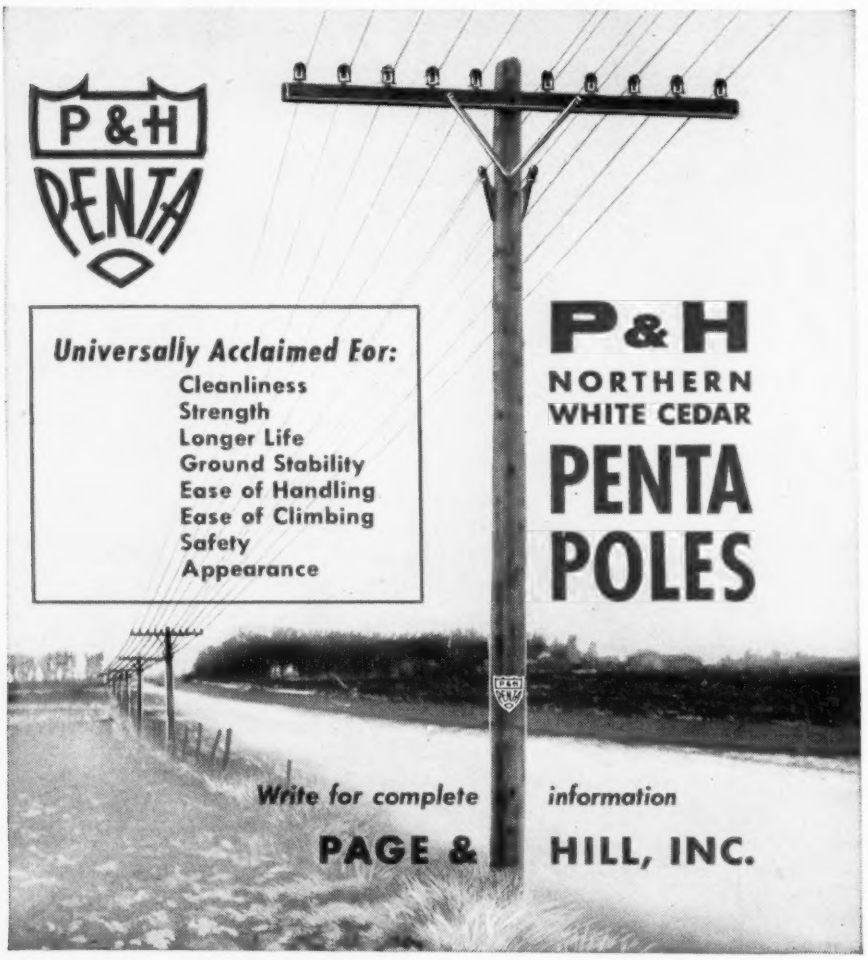
Before joining Kellogg in 1951, Mr. McDonald spent two years with Mills Industries, Inc. as resident counsel. He served previously as an attorney with the firm of Todd & Brown, Inc., New York City, and in the office of the general counsel of the National Housing Agency, Washington, D. C. He began his legal career in private practice in Chicago.

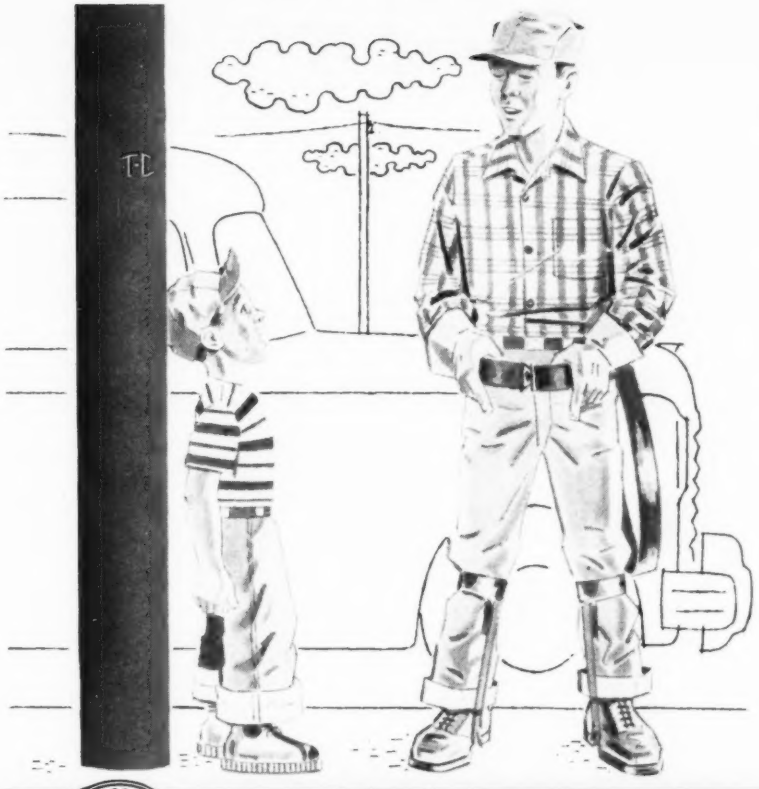
H. J. McDONALD

W. F. BOYD

From May 1941 to July 1946, Mr. McDonald served with the United States Army as a special agent in the Security Intelligence Corps and as a first lieutenant in the Judge Advocate General's Department. He was graduated from Loyola University with the Bachelor of Arts and Juris Doctor degrees and received a Master of Business Administration degree from the University of Chicago. He is a member of Alpha Sigma Nu honorary fraternity, the Chicago, American and Illinois Bar associations, and is vice president and director of the Chicago chapter of the Armed Forces Communications & Electronics Association.

Mr. Boyd, a native of Livingston, N. J., went to Kellogg from New York City, where he was assistant to the president of International Telephone & Telegraph Corp., the late Gen. William H. Harrison. He gained a broad background in personnel administration and





Dad says for me to stand up straight like a T-C pole

Excellent advice, son . . . stand up straight like T-C poles stand up for telephone companies all over the country. These companies have found, with T-C poles in their line they get longer trouble-free service. They've found from experience that they get the best in preservation when T-C pressure treated poles are specified.

T-C Pressure Treated poles are distributed by
AUTOMATIC ELECTRIC SALES CORP.
and LEICH SALES CORP.

TAYLOR-COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

Ruling Principles of Utility Regulation

RATE OF RETURN

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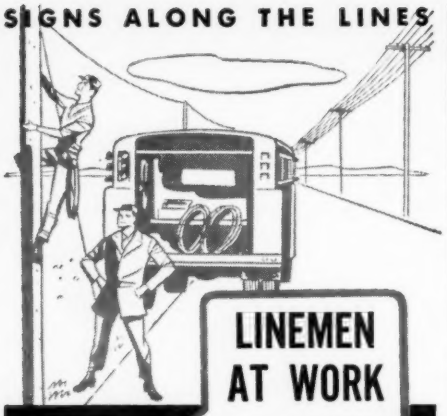

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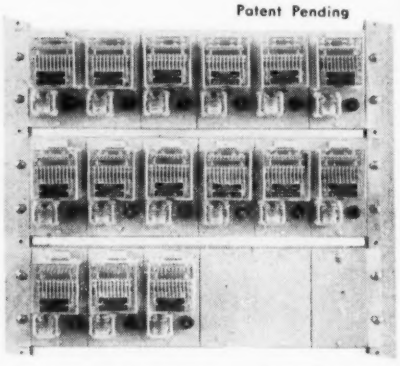

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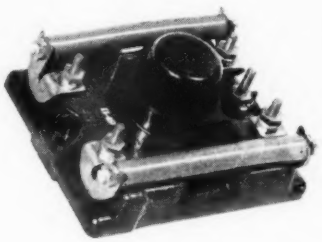

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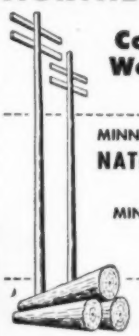

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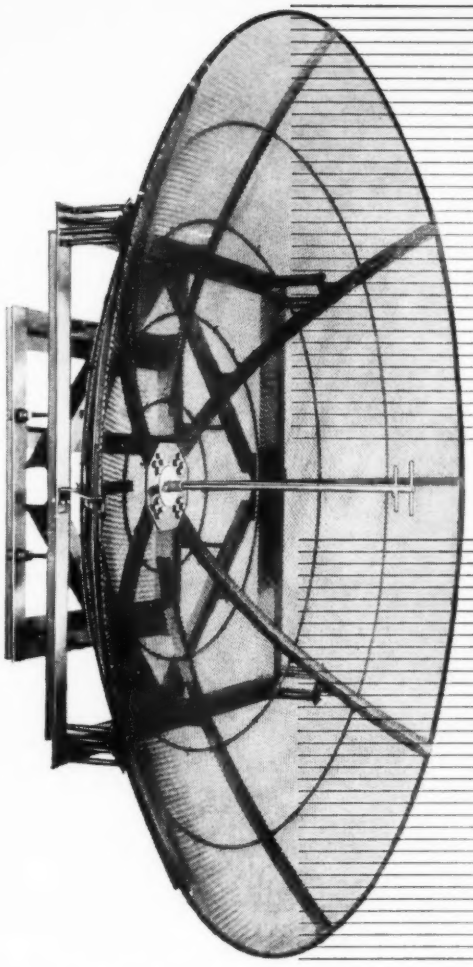

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